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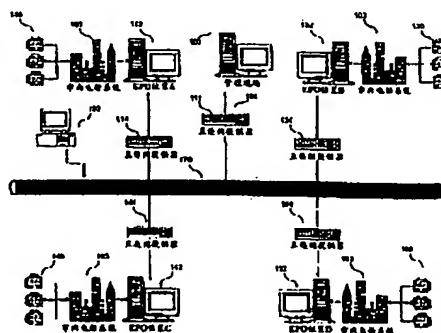
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权利要求书 4 页 说明书 18 页 附图页数 28 页

[54]发明名称 一种用于使传真机成为电子邮件客户机的方法和装置

[57]摘要

一种方法和装置,使有机会使用传真机(110)的用户能收发和管理电子邮件。如果用户选择“直接接收”模式,则自动地将电子邮件发送到他的传真机并打印。如果用户选择“按要求接收”模式,则用户呼叫预定的电话号码和回答语音提示以指令系统将他的未读出的电子邮件传真到哪里。也能够通过呼叫器或电话通知用户已保存未读出的电子邮件。由用户接收到的传真包含预定给用户的电子邮件消息的内容。如果用户将传真消息发送到与在用户的地址手册中的特定接收者有关的互连网(170)传真号码,则系统将包括传真内容的电子邮件消息发送到与互连网传真号码有关的接收者。



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权 利 要 求 书

1. 一种使传真机具有电子邮件客户的性质的系统, 包括:

一个部分, 所述部分接收从第二用户到第一用户选址的电子邮件消息, 所述电子邮件消息包括第二用户的电子邮件地址;

一个存储部分, 所述存储部分将第二用户的电子邮件地址存储在存储器中;

一个部分, 所述部分把一个唯一的代码和所存储的第二用户的电子邮件地址联系起来; 以及

一个发送部分, 当系统从第一用户接收传真消息而且传真消息和一个代码有关时, 所述发送部分将传真消息的内容发送到第二用户的电子邮件地址, 所述代码是指定给所存储的第二用户的电子邮件地址的唯一代码。

2. 如权利要求 1 所述的系统, 其特征在于, 所述唯一代码是电话传真号码, 称之为互连网传真号码, 目的地为电子邮件地址的书面文件传真到所述电话传真号码。

3. 如权利要求 2 所述的系统, 其特征在于, 所述发送部分包括一个部分, 通过检查发送消息的传真机的 CSID 和呼叫器 ID 号码中之一, 所述的一个部分确定所接收的传真消息是来自第一用户的。

4. 如权利要求 1 所述的系统, 其特征在于, 所述发送部分包括一个部分, 所述的一个部分确定所接收的传真消息是来自第一用户的, 因为第一用户通过远程发送命令发送消息。

5. 如权利要求 1 所述的系统, 其特征在于, 所述存储部分将第二用户的地址存储在第一用户的地址手册数据结构中, 将地址手册数据结构存储在存储器中。

6. 如权利要求 1 所述的系统, 其特征在于, 所述发送部分还包括一个部分, 所述的一个部分将传真消息转换成 TIF 格式。

7. 一种使传真机具有电子邮件客户的性质的系统, 包括:

一个部分, 所述部分接收来自第一用户, 指定第二用户的电子邮件地址的输入;

一个部分, 所述部分将第二用户的电子邮件地址存储在存储器中;

一个部分，所述部分把一个唯一代码和所存储的第二用户的电子邮件地址联系起来；以及

一个发送部分，当系统从第一用户接收传真消息而且传真消息和一个代码有关时，所述发送部分将传真消息的内容发送到第二用户的电子邮件地址，所述代码是指定给所存储的第二用户的电子邮件地址的唯一代码。

8. 如权利要求 7 所述的系统，其特征在于，所述发送部分包括一个部分，通过检查发送消息的传真机的 CSID 和呼叫器 ID 号码中之一，所述的一个部分确定所接收的传真消息是来自第一用户的。

9. 如权利要求 7 所述的系统，其特征在于，所述发送部分包括一个部分，所述的一个部分确定所接收的传真消息是来自第一用户的，因为第一用户通过远程发送命令发送消息。

10. 一种用于使传真机起电子邮件客户的作用的方法，包括通过数据处理系统完成的步骤：

从经过互连网的计算机系统和经过电话线的传真机中的一个，接收从第二用户到第一用户选址的所述电子邮件消息，并包括第二用户的电子邮件地址；

确定传真机的电话号码，所述传真机的电话号码是根据第一用户的电子邮件地址指定给第一用户的；以及

发送传真消息到确定电话号码，所述传真消息包含电子邮件消息的内容。

11. 如权利要求 10 所述的方法，其特征在于，还包括步骤：

将第二用户的电子邮件地址与第二用户的互连网传真号码一起增加到第一用户的地址手册数据结构，将所述地址手册数据结构存储在存储器中。

12. 一种用于使传真机起电子邮件客户的作用的方法，包括通过数据处理系统完成的步骤：

从计算机系统和传真机中之一接收从第二用户到第一用户选址的所述电子邮件消息，并包括第二用户的电子邮件地址；

一旦第一用户已经请求将他的电子邮件发送给他，从第一用户请求一个传真机的电话号码，第一用户希望将他的电子邮件传真到所述传真机；

接收来自第一用户的，指定一个传真机电话号码的输入；以及

发送传真消息到指定的电话号码，所述传真消息包含电子邮件消息的内容。

13. 如权利要求 12 所述的方法，其特征在于，还包括通知用户的步骤，当

接收到从第二用户到第一用户选址的电子邮件消息时，使用一呼叫器或电话通知用户。

14. 一种用于使传真机起电子邮件客户的作用的方法，包括通过数据处理系统完成的步骤：

接收传真消息，所述传真消息是由第一用户从一台传真机发送的，其中，传真机对与第二用户有关的互连网传真号码拨号；

确定第一用户的识别符，根据传真机的 CSID 和呼叫器 ID 号码之一确定；

确定第二用户的电子邮件地址，根据传真机所拨的互连网传真号码，从第一用户地址手册数据结构确定；以及

发送包括所接收的传真消息的电子邮件消息到在确定电子邮件地址的第二用户。

15. 一种使传真机具有电子邮件客户的性质的系统，包括：

一个部分，所述部分将第一传真消息发送到传真机，第一传真消息包括由第二用户发送给第一用户的第一电子邮件消息的内容，第一电子邮件消息包括第二用户的电子邮件地址；以及

一个部分，所述部分根据从传真机接收到的第二传真消息，将第二电子邮件消息发送给第二用户，所述第二传真消息是由第一用户发送的。

16. 如权利要求 15 所述的系统，其特征在于，还包括：

一个部分，所述部分从第一电子邮件消息录取第二用户的电子邮件地址；以及

一个部分，所述部分将第二用户的电子邮件地址与指定给第二用户的互连网传真号码一起增加到第一用户的地址手册数据结构，

其中，发送第二电子邮件消息的部分根据第一用户的识别符，并根据指定给第二用户的互连网传真号码发送第二电子邮件消息，所述第一用户的识别符是由用于发送第二传真消息的传真机的 CSID 和呼叫器 ID 号码之一确定的。

17. 如权利要求 15 所述的系统，其特征在于，将第一传真消息发送到传真机的部分包括：

一个请求部分，一旦第一用户已经请求将他的电子邮件发送给他，从第一用户请求一个传真机的电话号码，第一用户希望将他的电子邮件传真到所述传真机；

一个接收部分，所述部分接收来自第一用户的，指定一个传真机的电话号码的输入；以及

一个发送部分，将第一传真消息发送到指定的电话号码。

18. 如权利要求 15 所述的系统，其特征在于，传真机是所指定的第一用户的传真机以及其中发送第一传真消息的部分包括：

一个部分，根据第一用户的电子邮件地址确定传真机的电话号码；以及

一个部分，将第一传真消息发送到所确定的电话号码。

19. 一种输入字母数字字符的方法，包括由从键盘接收输入的数据处理系统完成的步骤：

接收一种指示，指示出用户在键盘上已经至少按了一次键；

用第一音调变化口头响应相应于所按的键的字符；

接收一种指示，指示出用户在键盘上已经按了“终止”键；

用第二音调变化口头响应相应于所按的键的字符。

20. 如权利要求 18 所述的方法，其特征在于，第一音调变化是疑问音调变化以及第二音调变化是稳定音调变化和下降音调变化中之一。

说明书

一种用于使传真机成为电子邮件客户机的方法和装置

发明领域

本申请涉及无线电通信，特别涉及用于使传真机具有电子邮件客户机的性质的一种方法和装置。

发明背景

近年来，电子邮件已经变成极为流行。拥有个人计算机的人可以向其他计算机用户发送电子邮件消息和从其他计算机用户接收电子邮件消息。此外，人们可以用他们的个人计算机同时向多个用户发送电子邮件。

与其它发送信息的方法相比，电子邮件有几个优点。它是便宜的，由于可以在世界上的任何地方通过互连网发送电子邮件消息而不增加费用。电子邮件是效率高的，因为它可以向几个人或成千的人快速和不费力地播发。电子邮件保持高质量的消息。不管它发送多少次数，消息的可读性和鲜明性总是保持相同。电子邮件是可以检查的，因为可以将消息存储或记录以供方便地访问。电子邮件是私人用的，只要每个人有他自己的独立的电子邮件地址和口令。最后，电子邮件是不需要调度的，因为用户不必为进行电子邮件通信而协调调度。

不幸的是，在世界上不是所有的人都有使用计算机的机会。有些人在任何时间都没有使用计算机的机会。这些人不能通过传统的方法发送或接收电子邮件。还有其他一些人，当他们离开他们的家或办公室时，他们没有随身携带便携式计算机。当这些人外出时，他们和他们的电子邮件断开。然而，通常大多数人都有使用传真机(fax)的机会。因为许多传统的计算机可以通过电话线发送传真，传统计算机可以将传真发送给有传真机的人。

然而，发送传统传真的一个问题是，在传真机处的接收者不能发回电子邮件，因为他们没有使用计算机的机会。而人们用传真机能发送可以由计算机接收的传真，为了接收传真，必须使接收计算机运行。不管接收者是否知道有电子邮件进来，他都能接收电子邮件，对于向 PC(个人计算机)发送传真或接收来自 PC 的传

真电子邮件的方便性并未得到充分利用。

从计算机发送传统传真(代替发送电子邮件)的另一个问题是从计算机发送传真的过程和从计算机发送电子邮件的过程是不同的。因此,在计算机处的发送者必须记得需要向指定的接收者发送传真(与电子邮件不同)并且使用正确的发送过程。这对发送者来说是不方便的。

从计算机发送传统传真的另一个问题是发送传真要承担长途话费,而通过诸如互连网这样的网络发送电子邮件仅承担网络使用费,这种费用不随所发送的数据量而变化。

此外,如果在传真接收者终端的整个办公室只有一个传真机,发送者不可能将传真发送给指定的人作为私人接收。所需要的是一种方法使传真机的所有者能方便地发送和接收电子邮件,即使用计算机的人在同时发送和接收电子邮件是显而易见的。

许多电话信息系统允许用户使用按键电话的键输入数字字符。许多用户发现这种输入字符的方法容易弄错。所需要的是一种方法使用户能通过按键键盘输入数字字符而不会弄错。

发明概要

本发明克服现有技术的问题和缺点,使有使用传真机机会的用户能方便地发送和接收电子邮件。特别是,本发明使传真机的性能象一个电子邮件客户机。电子邮件客户机是一种机构,通过这种机构能发送和接收电子消息。电子邮件客户机也能管理过去的消息。

在本发明的较佳实施例中,用户可以选择两个接收模式中的一个用于接收他的电子邮件。如果用户选择“直接接收”的接收模式,则将所接收的电子邮件自动地发送到用户指定的传真机,并在那里将它立即打印出来。相反,如果用户选择“按要求接收”的接收模式,则用户呼叫一个预定的电话号码并应答语音提示以指示系统将他未读出的电子邮件传真到那里。随意地,可以自动地通知用户消息正在等待(通过寻呼机或通过电话消息)。在每种情况下,由用户接收的传真中包括预定给用户的电子邮件消息的内容。

发送电子邮件也是简单的。用户建立可能的电子邮件接收者或接收者组(诸如邮件清单)的电子邮件地址的“地址手册”。在地址手册中每一电子邮件地址与一

传真号有关(也将其称为“互连网传真号”)。如果用户将消息传真到与在用户地址手册中的特定用户有关的电话号码,则系统发送包括传真消息内容的电子邮件消息到与互连网传真号码有关的接收者的电子邮件地址。

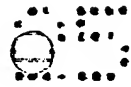
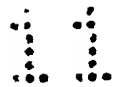
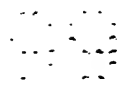
用两种方法建立在用户地址手册中的入口。当用户第一次从某人接收到电子邮件时就建立了入口。在这情况下,发送者的电子邮件地址就加到接收者的地址手册,而传真号码(互连网传真号码)就与电子邮件地址有关。用户也可以通过呼叫预定的电话号码和响应于语音提示而手动地输入要放在他的地址手册中的电子邮件地址而建立入口。系统将与输入的电子邮件地址有关的互连网传真号码以声音通知用户,并打印在传真的消息中。

在较佳实施例中,将由用户传真的电子邮件以图形格式,诸如 GIF(图形交换格式)、TIF(标记图象格式)或附言(便于打印),发送给接收者。因此,通过将图形传真给接收者的互连网传真号码,用户可以用电子邮件将图形发送他人。

如在此广泛地描述和实施的,根据本发明的目的,本发明涉及一种系统,该系统使传真机具有电子邮件客户机的性质,它包括:一个部分,该部分接收从第二用户送到第一用户的电子邮件消息,电子邮件消息包括第二用户的电子邮件地址;一个部分,该部分将第二用户的电子邮件地址存储在存储器中;一个部分,该部分使唯一的代码与所存储的第二用户的电子邮件地址有关;以及一个部分,当系统接收来自第一用户的传真消息和传真消息与一个代码有关时,将传真消息的内容发送到第二用户的电子邮件地址,所述代码是指定给第二用户的所存储的电子邮件地址的唯一代码。

如在此广泛地描述和实施的,根据本发明的进一步的目的,本发明涉及一种系统,该系统使传真机具有电子邮件客户机的性质,它包括:一个部分,该部分接收来自第一用户的输入,指定第二用户的电子邮件地址;一个部分,该部分将第二用户的电子邮件地址存储在存储器中;一个部分,该部分使唯一的代码与所存储的第二用户的电子邮件地址有关;以及一个部分,当系统接收来自第一用户的传真消息和传真消息与一个代码有关时,将传真消息的内容发送到第二用户的电子邮件地址,所述代码是指定给第二用户的所存储的电子邮件地址的唯一代码。

如在此广泛地描述和实施的,根据本发明的进一步的目的,本发明涉及一种方法,用于使传真机可作为电子邮件客户机而运行,它包括由数据处理系统完成



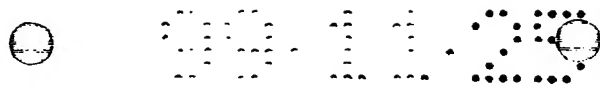
的步骤：从通过互连网的一个计算机系统和通过电话线的传真机之一，接收从第二用户发送给第一用户的电子邮件消息，并包括第二用户的电子邮件地址；根据第一用户的电子邮件地址，确定指定给第一用户的传真机的电话号码；以及将包含电子邮件消息的内容的传真消息发送到所确定的电话号码。

如在此广泛地描述和实施的，根据本发明的进一步的目的是，本发明涉及一种方法，用于使传真机可作为电子邮件客户机而运行，它包括由数据处理系统完成的步骤：从一个计算机系统和传真机，接收从第二用户发送给第一用户的电子邮件消息，并包括第二用户的电子邮件地址；一旦第一用户已经请求将他的电子邮件发送给他，从第一用户请求传真机的电话号码，第一用户希望将他要传真的电子邮件传真到该号码；从第一用户指定的传真机电话号码接收输入；以及将包含电子邮件消息内容的传真消息发送到指定的电话号码。

如在此广泛地描述和实施的，根据本发明的进一步的目的是，本发明涉及一种方法，用于使传真机可作为电子邮件客户机而运行，它包括由数据处理系统完成的步骤：接收传真消息，所述传真消息是由第一用户的传真机发送的，而该传真机对与第二用户有关的互连网传真号码拨号；根据传真机的用户服务识别符 (Customer Service ID) 确定第一用户的识别符；从第一用户的地址手册数据结构，根据由传真机拨的互连网传真号码，确定第二用户电子邮件地址；以及将包含所接收的传真消息的电子邮件消息发送到在所确定的电子邮件地址的第二用户。

如在此广泛地描述和实施的，根据本发明的目的，本发明涉及一种系统，该系统使传真机具有电子邮件客户机的性质，它包括：一个部分，该部分将第一传真消息发送到传真机，第一传真消息包括由第二用户向第一用户发送的第一电子邮件消息的内容，第一电子邮件消息包括第二用户的电子邮件地址；以及一个部分，根据从传真机接收的第二传真消息，由第一用户发送的第二传真消息，该部分将第二电子邮件发送给第二用户。

本发明的另一个方面包括一种方法，在该方法中，当用户通过按键电话的键盘输入字母数字信息时，该系统用声音提示用户。当用户轻按键一次、两次、三次或四次时，系统发出第一种疑问音调变化的声音来响应相应的字符。一旦用户轻按“终止”键(诸如“#”)，系统通过用第二种，说明的音调变化对字符发音，表示它已接收了最后的字符。两种不同音调变化的使用对用户提供了已经正确地记录字符的口头的暗示。这种口头暗示使用户的弄错减至最小。



本发明的目的和优点部分将在接下来的说明中讲述，部分将从说明中得到明了或从发明的实践中了解。通过部件、方法步骤和其混合，特别是在所附的权利要求和其等同中，可以实现和达到本发明的目的和优点。

附图简述

结合构成本说明书的一部分的附图，说明本发明的几个实施例，以及结合说明，解释本发明的原理。

图 1 是方框图，示出本发明的较佳实施例可使用的计算机和电话网络的概述。

图 2 是在图 1 的系统中的消息路径的方框图。

图 3 是用于根据本发明的较佳实施例的计算机系统的方框图。

图 4(a)到图 4(c)是方框图，示出由在图 1 的系统中的消息所取的各种路径。

图 5-8 是流程图，示出用户输入菜单的组成。

图 9(a)示出地址手册数据结构的示例格式。

图 9(b)示出存储由用户接收的消息的数据库的示例格式。

图 10 是管理系统部件和图 1 的电子邮局(EPO)之间的流程框图。

图 11 是由图 10 的来件处理完成的步骤流程图。

图 12 是由图 10 的发件处理完成的步骤流程图。

图 13 是示出图 10 的 EPO 的部件的流程图。

图 14 是示出由图 13 的调度程序完成的步骤的流程图。

图 15 是示出由图 13 的定时器完成的步骤的流程图。

图 16 是示出由在图 13 的排队处理器中的排队处理完成的步骤的流程图。

图 17 是示出由在图 13 的排队处理器中的去排队处理完成的步骤的流程图。

图 18 是示出由在图 13 的排队处理器中的再排队处理完成的步骤的流程图。

图 19 是示出由在图 13 的排队处理器中的确认器完成的步骤的流程图。

图 20 是示出由图 13 的邮递员处理器完成的步骤的流程图。

图 21 和 22 是示出由图 13 的呼叫处理器完成的步骤的流程图。

图 23 是示出由图 10 的 EPO 请求处理器完成的步骤的流程图。

图 24 是在本发明的较佳实施例中使用的在排队数据结构中的“任务”入口的示例格式。

图 25(a)到图 25(c)是流程图，示出在本发明的较佳实施例中采用的步骤，使用户通过按键电话的键盘输入数字字符。

较佳实施例的说明

现在详细地参照本发明的较佳实施例，在附图中说明其示例。任何可能之处，在所有的图纸中，相同的标号表示相同的部件。

I. 系统概述

图 1 是方框图，示出本发明的较佳实施例可使用的计算机和电话网络的概述。图 1 包括多个用户，诸如用户 110、130、140 和 150。假定每个用户可以有使用一台传真机的机会。通过相应的本地/市内电话系统 103，用户 110、130、140 和 150 的传真机连接到相应的电子邮局(EPO)112、132、142、152。各 EPO 依次连接到相应的互连网服务提供者(ISP)114、134、144、154，它们依次连接到诸如互连网 170 这样的网络。不用说，也可以将本发明与不是互连网的网络，例如诸如内部网一起使用。也可以将本发明用于任何合适的网络类型的组合。

图 1 进一步示出管理现场 100，它连接到 ISP 111。不用说，互连网可以连接管理现场 110 和至少一个 EPO，如图所示，但是可以连接另外的合适类型的网络。例如，会发生这样的情况，如果管理现场 100 和 EPO 位于相同的物理位置上。

ISP 111 连接到诸如互连网 170 的网络上。图 1 还示出计算机 120，它连接到互连网。计算机 120(及 EPO 和管理现场)可以通过 ISP 连接到互连网或直接连接。注意，由于它们使用互连网，管理现场 100 和 EPO 之间的消息不承担长途电话费。EPO 和用户 110、130、140 和 150 之间的呼叫最好是本地呼叫。

图 2 是在图 1 的实施例中的消息路径的方框图。消息通过传真服务器 200(在一 EPO 中)和通过管理现场 100，所述管理现场包括邮件处理主体 202 和 SMTP(简单邮件传送协议)服务器 204。

图 3 是用于根据图 1 的实施例的计算机系统的方框图。虽然图 3 示出邮件处理主体 202 的实现，但熟悉本领域的人将会理解，可用相似的方式实现传真服务器 200SMTP 服务器 204 和 EPO 112、142、152。

在图 3 中，计算机系统 204 包括：处理器 302；存储器 304；输入/输出线

305 ; 输入装置 305 , 诸如键盘或鼠标器; 以及显示装置 360 , 诸如显示器终端。计算机 204 还包括输入装置 361 , 诸如软盘驱动器或 CD ROM 读出器, 它读出存储在计算机可读媒体 362(诸如软盘或 CD ROM)中的计算机指令。这些计算机指令是, 例如, 邮件处理 320 的指令。每个图 1 的 EPO 包括数据库, 如在下面进一步详述的, 并具有音频板, 传真板, 以及呼叫处理软件, 以控制它们的操作。

一个熟悉本领域基本技术的人会理解, 存储器 304 还包含另外的信息, 诸如应用程序、操作系统、数据等, 为清楚起见未将它们示于图中。还可以理解, 计算机系统 204 也可以包括许多部件, 诸如盘片驱动、键盘、显示器装置、网络连接、附加存储器、附加 CPU 、 LAN 、 互连网连接、输入/输出线等, 为清楚起见未将它们示于图中。

在下面的讨论中, 不用说, 通过处理器 302(或相似的处理器)执行存储在存储器中的指令, 诸如邮件处理软件 320 的指令, 完成所讨论的最佳的方法和流程图步骤。还应明白, 本发明不限于特别的实施或编程技术, 可以用任何合适的技术来实现这里所描述的功能而实施本发明。在所描述的实施例中, 用 C++编程语言写管理现场 100 并在 WINDOWS 95 操作系统下运行。(“WINDOWS 95”是 Microsoft 公司的商标)。最好以用于 DOS 的 VOS(语音操作系统)写 EPO。从奇偶性软件可得到 VOS。然而, 本发明不限于特别的编程语言或操作系统。

图 4(a)到图 4(c)是方框图, 示出由在图 1 的系统中的消息所取的各种路径。图 4(a)示出从计算机发送到传真机的电子邮件消息的路径。在图中, 有“ I ”的线表示在互连网 170(或其它合适的网络)上行进, 而有“ T ”的线表示在电话系统 103 上行进。在图 4(a)中, 由计算机诸如图 1 的计算机 120 将送至系统用户的电子邮件消息通过互连网发送到一个 ISP, 诸如管理现场 100 的 ISP 111。管理现场 100 将消息发送到与用户的接收传真机有关的 EPO, 它通过电话线将消息发送到用户的传真机, 诸如用户传真机 130。

图 4(b)示出从系统用户的传真机发送到计算机的电子邮件消息的路径。由用户传真机, 诸如图 1 的用户机 130, 通过电话线将电子邮件消息发送到与传真机有关的 EPO(例如, 在和传真机相同的呼叫区中)。EPO 将消息发送到管理现场 100, 它通过互连网将包含传真消息内容的电子邮件消息发送到计算机 120。

图 4(c)示出从第一传真机发送到第二传真机的电子邮件消息的路径。(实际

上, 这种路径的每一个都是从有系统帐户的第一用户到有系统帐户的第二用户发送传真的组合)。由第一用户传真机, 诸如图 1 的用户机 130, 通过电话线将电子邮件消息发送给有关的第一 EPO。第一 EPO 将传真消息发送到管理现场 100, 它将消息作为电子邮件在互连网上发送到系统的第二用户。因为供给第二用户的电子邮件送到管理现场 100, 管理现场接收到预定供给它的第二用户的电子邮件, 将其转换成传真消息, 并将传真消息发送到与第二用户传真机有关的第二 EPO。EPO 通过电话线 103 将传真发送到用户的传真机。消息不必通过 ISP 回到管理现场 100。在管理现场, 它仅作为输入和输出电子邮件进行处理而不通过 ISP。

II. 用户电话接口

图 5-8 是流程图, 示出在本发明的较佳实施例中的用户输入菜单的组成。

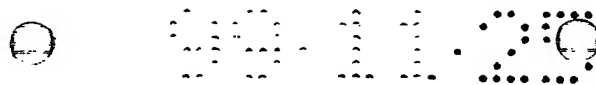
用户对 EPO 的预定电话号码发出一个语音呼叫(最好是本地 EPO, 以节约长途费用)。EPO 与用户相互作用, 提示用户, 并处理用户对提示的响应。最好通过记录或合成的语音来讲用户提示。用户通过使用按键电话上的键输入他的响应。将下面描述的系统称为交互式语音响应(IVR)系统。使用 IVR, 用户可以完成诸如在他的地址手册中输入电子邮件地址和取回(在某些情况下)他所保留的电子邮件消息等工作。用户还能够改变各种系统参数。

如图 5 所示, 用户必须首先通过输入他的帐户号码和密码, 记录在 EPO 中。所描述的 IVR 强力-用户菜单(Power-user menu)有三种主要的选择: 远程发送; 主菜单(包括地址手册、归档操作和组成任选); 以及强力取回(Power retrieval)。各种系统可能允许某些用户完成下列功能的几个子组。例如, 在所述的实施例中, 不允许某些用户完成远程取回。作为替代, 一旦接收到消息, 将他们所有的消息都发送到他们的默认传真机。

不用说, 这里仅为了示例的目的提出了所描述的 IVR 系统, 在任何情况下不应将其作为对本发明的限制。不管是 IVR 系统或某些其他类型的系统, 可将任何接口用于本发明, 只要它能使用户管理基本功能, 诸如发送、接收、地址手册功能和归档。

a) 远程发送

如果用户选择“远程发送”, 就向用户提供接收者的互连网传真号码。在用户输入互连网传真号码和按在传真机上的“发送按钮”之后, 系统接收传真消息



并将电子邮件消息发送到与用户输入的互连网传真号码有关的人的电子邮件地址。电子邮件消息包括传真消息的内容。

b) 主菜单(地址手册、消息归档、接收和保密模式)

i) 地址手册

所描述的实施例的地址手册特性使系统保留电子邮件地址，因此用户不必每次都输入地址。用户通过从他的经登记的传真机将消息传真到在他的地址手册中指定给一个人的互连网传真号码，就可以将消息发送给这个地址在他的地址手册中的人。每次，用户从先前没有发送过用户电子邮件的人那里接收电子邮件时，系统自动地在地址手册中做一个入口。如图 6 所示，用户也能手动地将人加到他的地址手册中。

图 9(a)示出地址手册数据结构的示例格式。每个用户有包括 N 个互连网传真号码的地址手册。在一个较佳实施例中，EPO 有 1000 个指定给它的互连网传真号码，所以 N 等于 1000。(其他的实施可以用另外的 N 值)。每个用户在他的地址手册中有相同的 N 个互连网传真号码(虽然某些可能未被指定)。系统首先在地址手册中找到目前用户的位置，然后对由要发送传真的用户拨/输入的互连网传真号码进行查找操作，系统确定由特定用户传真的消息要发送到哪个电子邮件地址。因此，对于每个用户，互连网传真号码是“唯一的代码”，以识别来自用户电子邮件的可能的接收者。

如果用户选择“地址手册”，任选地，用户得到在三种任选中选择的提示：得到地址清单；增加地址；和移动地址。

图 6 示出地址手册任选的细节。如果用户选择“得到地址清单”，系统准备包含用户地址手册的打印内容的页面(例如，电子邮件地址和对于每个入口的互连网传真号码)并控制进入到图 6 的步骤 C(在下面描述)，其中，将所准备的页面传真给在指定传真机处的用户。

如果用户选择“增加地址”，则系统向用户提示新的入口的电子邮件地址，在用户的地址手册中的下一个空的互连网传真号码上放置电子邮件地址，并将新的互连网传真号码传回给用户。如果用户选择“删除地址”，则系统向用户提示新的入口的互连网传真号码，从用户的地址手册中删除相应于互连网传真号码的入口，保留空出的互连网传真号码供以后指定，并向用户传回“成功完成”的消息。

对于在所描述的实施例中的许多功能，重复进行图 6 的步骤 C，因此，单独地在下面的段落中描述。在系统已经准备要传真给用户的一页或几页信息后，系统向用户提示要向其发送页面的传真机的位置。在所述的实施例中，如果用户正在从传真机呼叫，系统提示用户他应该按在传真机上的“开始”键。由于在系统和传真机之间已经存在电话连接，没有什么复杂就将所准备的页面发送到传真机。如果用户不是从传真机呼叫，则系统问用户他是否希望将他的页面发送到他的指定的正规传真机。如是，即发送页面，如果不是，用户可以输入他希望发送页面的传真机的电话号码。

允许用户指定他希望发送信息的传真机的位置使用户能将他的信息发送到离他现在位置最近的传真机。这一特性对在旅行的用户或他们自己没有传真机的用户极有价值。

ii)消息归档

如果用户选择“消息归档”，则对用户显示另外三个选择：列出过去消息；取回过去消息；和发送过去消息。图 7 示出这些选择中的每一个的细节。

图 9(b)示出用于存储由用户接收到的消息的示例数据结构。对每个消息指定一个消息识别符(id)并具有一个或多个标志，指示用户是否已经读出消息和用户是否已经将消息归档。

如果用户选择“列出过去消息”，则用户得到提示要确定他希望观看哪个过去消息(由月和年)以及，系统准备包含由用户指定的消息的打印清单(发送者、日期、消息识别符、主题和页数)的页面。然后控制进入到图 6 的步骤 C，在指定的传真机上将所准备的页面传真给用户。在本发明的较佳实施例中还允许用户取回从在用户的地址手册中指定的一个人发送/接收的过去消息的清单。

如果用户选择“取回过去消息”，则用户得到提示要指定他希望观看哪个过去消息(由消息识别符)以及，系统准备包含所指定的消息的内容的页面。然后控制进入到图 6 的步骤 C，在指定的传真机上将所准备的页面传真给用户。

如果用户选择“发送过去消息给在地址手册中的某人”，则用户得到提示要确定用户希望发送哪个过去消息以及他希望将它们发送到哪个互连网传真号码。然后系统准备包含指定消息内容的页面并将所准备的页面以电子邮件发送给指定的接收者。

iii)改变接收和保密模式

如图 5 所示, 用户可以在两个接收模式之间转换: 按请求接收和直接接收。按请求接收意味着保持发送给用户的电子邮件消息直到用户呼叫输入它们。直接接收意味着用户接收的电子邮件消息直接发送到他所指定的传真机。如果用户行动范围较大并且不是经常离同一传真机很近, 则按要求接收是很有用的。对那些经常离他们的传真机很近的人来说, 直接接收是很有用的, 因为所接收的消息由传真机打印而不需要等待用户的操作。

如图 5 所示, 用户也能够转换保密的通和断。如果保密是接通的, 如上所述, 用户必须通过远程发送方法发送消息。远程发送要求用户在发送消息前输入计数号码和密码。在某些实施中, 用户必须输入他的帐号和密码以改变保密选择, 尽管他已经输入它们以记录在 IVM 系统中。

c) 强力取回菜单

如果用户选择在强力用户菜单上的第三种选择(例如, 强力取回), 则用户得到三种选择的提示: 列出所保持的消息, 取回所保持的消息, 归档不读出的消息。如果用户先前已经指示他希望有“按请求接收”的接收模式, 则仅在这种情况下提供强力取回选择。

图 8 示出强力取回的细节。如果用户选择“列出所保持的消息”, 则系统准备列出用户未读出的消息的页面, 包括每一个消息的消息识别符, 并且控制进入到图 6 的 C, 制备的页面被传真到位于特定传真机的用户。如果用户选择“取回所保持消息”, 则系统提示用户关于要取回的消息的消息识别符, (或关于发送所有所保持消息的指示)并且准备列出用户指定的消息的内容的页面。然后, 控制进入到图 6 的步骤 C, 在那里将所准备的页面传真到在指定传真机处的用户。如果用户选择“归档不读出的消息”, 则系统提示用户关于要移动的消息的消息识别符(或关于移动所有所保持消息的指示)并移动消息使之归档。

III. 管理现场

图 10 是与 EPO(诸如图 1 的 EPO 112)通信的图 1 的管理现场 100 的部件之间的流程方框图。管理现场 100 与 EPO 分享文件系统。文件系统包含要由系统发送给用户传真机的消息。管理现场 100 通过 FTP(文件传送协议)或任何合适的消息系统与 EPO 通信。

在管理现场 100 中, SMTP 服务器 204 接收来自互连网 170 电子邮件消息并将电子邮件消息发送到互连网 170。EPO 112 包括到电话线 103 的连接。管理现

场 100 包括数据库，它保持对接收者的优先权的跟踪。接收者不必是系统的顾客/用户。而，在一个时间或另外的，他们是曾经从系统的用户接收到电子邮件的人员。这些接收者的优先权包括对于每个接收者观察软件和格式的优先权，所接收的传真在作为电子邮件发送给接收者之前先经过转换。

管理现场 100 包括来件处理 1002 和发件处理 1004，在下面依次说明它们中的每一个。收件处理 1002 接收由 SMTP 服务器通过互连网接收的电子邮件消息，对它进行处理，并将它发送到 EPO 以待传真给正确的用户。发件处理 1004 接收从传真机接收到的传真消息，对它进行处理，并将它发送到 SMTP 服务器 204 以待通过互连网发送给正确的用户。

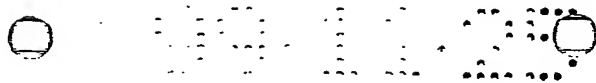
在图 11 的步骤 1102 中，收件处理 1102 等待来自 SMTP 服务器 204 的电子邮件消息。如果接收到电子邮件消息，则该处理对电子邮件消息进行解码。该步骤最好用 METAMAIL 来完成，所述 METAMAIL 是由 BELLCORE 开发的免费软件，该软件用 UU 或 MINE 编码处理电子邮件附件。在步骤 1106 中，将任何经压缩的附件进行解压缩。例如，将用 PK 软件的 PKZIP 积压缩的文件解开。如果解压缩失败，则收件处理在消息正文中插入那个结果的附注。

在步骤 1108 中，处理将所有附件转换到 TIF 格式。在所述的实施例中，使用 Handmade Software 生产的图象炼金术(Image Alchemy)；通过使用 Microsoft Word；和通过使用 Netscape Navigator 来完成该步骤。如果转换处理失败，则收件处理在消息正文中插入那个结果的附注。在步骤 1110 中，处理将正文和 TIF 信息进入到 EPO 机器，在那里，由 EPO 的调度程序处理将其拾取。EPO 将发送传真给用户，如下面联系图 13 所述。

本发明的所述实施例将所接收的电子邮件转换成用于传真的 TIF 文件。本发明的其它实施可能将电子邮件转换成 GIF 格式，或任何其它合适的格式。本实施也提供 GIF 和附言(PostScript)。

在发出电子邮件之前，所述实施例将所接收到的传真转换成接收者指定的格式。传真消息转换成 TIF 或任何相似的格式具有优点，即用户可以将图象信息像正文一样地传真给接收者。TIF 或相似格式的使用有一个缺点，即接收者必须有正确的观察软件来读出所接收的消息。

在图 12 的步骤 1202 中，发件处理等待来自 EPO 的传真消息。必须将传真消息转换成电子邮件消息然后发送。当接到消息时，控制进入到步骤 1204，在其中



锁存包含消息的文件，因此，没有其它邮件处理主体会“夺取”消息。在步骤 1206 中，发件处理读出所接收电子邮件消息的标头。如果在标头中有错误，则使出错消息跳回发送器。处理从标头中录取发送器的电子邮件地址并在步骤 1210 中，确定接收者是否曾经从系统接收过电子邮件。如果接收者是一个新的接收者，则将他增加到接收者数据库(未示出)并通过电子邮件将 TIF 观察器(或任何其他合适的观察器)发送给接收者，致使当输入消息到达时，他将能读出它。

本发明的所述实施例在把接收到的传真消息作为电子邮件发送之前先将接收到的传真消息转换成图象文件。在步骤 1216 中，将要输出的电子邮件转换成接收者更喜欢的图象格式(如由接收者数据库指示)。如果接收者没有指出喜欢的格式，(通过未示出的电子邮件命令系统)，则将传真消息转换成 TIF 格式。接收者可以指示的其它可能性包括 GIF、UU 编码、Mime、和 PostScript。

在步骤 1218 中，在将来变化格式的情况下，将经转换的图象存储在接收者的邮箱中。例如，接收者可能指示(通过电子邮件命令系统)他正在将他喜欢的格式改变为 GIF。在这情况下，系统将以 GIF 格式再发送他的先前的消息。然后将经转换的图象发送到 SMTP 服务器 204 以待通过互连网发送给接收者。

IV. 电子邮箱

图 13 是示出 EPO 1300 的部件的流程图。这些部件包括调度程序 1302、定时器 1304、邮箱 1303、排队处理器 1306、邮递员 1308 和呼叫处理器 1309。

图 14 是示出由图 13 的调度程序 1302 完成的步骤的流程图。将调度程序连接到互连网 170，因此，它能接收来自管理现场 100 的消息。当收件处理 1002 处理电子邮件消息时，在图 11 的步骤 1110 中，将它发送到 EPO 调度程序并在图 14 的步骤 1402 中接收。步骤 1402 锁存(保留)用于该处理的消息。如果在电子邮件中有消息，则控制进入到步骤 1408，在那里录取标头。如果在标头录取期间发生错误，在步骤 1410 中，使消息跳回发送器。在步骤 1412 中，将消息加到“过渡地带”(limbo)，所述过渡地带是所接收的消息组，但是用户不能得到，因为正在对它们进行处理。

在步骤 1414 中，如果发送器的电子邮件地址不在用户的地址手册中，则将地址加到用户的地址手册并给发送器指定互连网传真号码。

在步骤 1416 中，如果用户/接收者已经选择按要求接收，则将消息加到在邮箱数据库 1303 中的用户的保留邮箱中。否则，如果用户已经选择直接接收，则将

消息加到在邮箱数据库 1303 中的用户的接收邮箱中。在步骤 1420 中，如果接收模式是直接接收，那么调度在不久就将消息传递给用户。步骤 1424 解除在步骤 1402 中设置的对消息的保留，步骤 1402 锁存(保留)用于该处理的消息。步骤 1426 解除在步骤 1412 中设置的过渡地带状态。

图 15 是示出由图 13 的定时器完成的步骤的流程图。在步骤 1502 中，定时器等等待唤醒时间的发生或等待设置定时器消息。在步骤 1504 中，如果设置时间消息发生并且该时间比现在的唤醒时间要早，那么新的时间成为唤醒时间。在步骤 1506 中，当达到唤醒时间时，定时器通知排队处理器是处理排队消息的时间了。

如图 13 所示，排队处理器包括：编队器、解队器、再排队器和确认器，在图 16-19 中分别示出它们的操作。图 16 是示出由编队器完成的步骤的流程图。定时器通知编队器有准备传真的任务，并将任务放到队列中。步骤 1602 等待定时器突然行动。如果，在步骤 1604 中，准备发送经调度的项目，控制进入到步骤 1606。

“任务”是待传真的文件/消息。“用户”(在图 16 的前后关系中)意味着系统对所给出的用户准备所有未读出消息(例如，建立包括所有未读出消息的任务然后将该任务传真)。在步骤 1606 中，如果所调度的项目是一个任务，则步骤 1612 将该任务放在队列中。如果步骤 1612 失败，则如图 18 所示，重试该任务。如果，在步骤 1606 中，所调度的项目是用户，则在步骤 1608 中系统建立对用户的未读出消息的任务并在步骤 1612 中将新建立的任务放在队列中。

图 17 是示出由解队器完成的步骤的流程图。在步骤 1702 中，解队器等待邮递员请求发送传真。当接收到这种请求时，如果，在步骤 1704 中，在队列中有一个项目，则从队列中除去该项目，放在“排队过渡地带”并转到待传真的邮递员处理。

图 18 是示出由再排队器完成的步骤的流程图。再排队器将失败的任务放回队列以便再-传真。步骤 1802 等待文件再排队。当这发生时，再排队器确定文件是否已经超过预定的重试计数值。如果已超过，则在步骤 1806 中使消息跳回发送器。如果没有超过，则步骤 1808 确定在重试前的等待延迟量。延迟量可以基于任何合适的公式，诸如“如果传真机忙的话，在三分钟内重试；如果传真机没有纸在四小时内重试。”。步骤 1810 调度下一次发送试验的任务。步骤 1812 从队列过渡地带解除任务。

图 19 是示出由确认器完成的步骤的流程图。确认器从过渡地带除去成功的传真(见图 17 的步骤 1706)。在步骤 1902 中, 当接收到传真确认消息时, 如果, 在步骤 1904 中, 在现在的传真中有已发送的消息, 则将已发送的消息移去归档。在每种情况下, 将文件从排队过渡地带解除。

图 20 是示出由图 13 的邮递员处理完成的步骤的流程图。在步骤 2002 中, 邮递员请求来自解队器的下一次任务。如果没有现成的任务, 在步骤 2004 中邮递员等待排队告诉他任务已准备好。否则, 在步骤 2006 中, 邮递员将新任务通知呼叫处理器。

图 21 和 22 是示出由图 13 的呼叫处理器完成的步骤的流程图。本发明的较佳实施例对每一电话线有一呼叫处理器。呼叫处理器等待呼叫或传真发送, 并且根据呼叫的类型可以发送或接收传真。它还对访问 EPO 的呼叫者显示语音菜单并处理他们的响应。

在步骤 2102 和 2104 中, 一旦已经接收到一个呼叫, 呼叫处理器确定该呼叫是进来的呼叫(到 EPO)还是出去的呼叫(来自 EPO)。如果呼叫是出去的, 则呼叫处理器完成步骤 2108 到 2126。如果呼叫是进来的, 则呼叫处理器完成步骤 2140 到 2216(图 22)。

下面段落讨论进来呼叫的处理。在步骤 2106 中, 呼叫处理器确定进来呼叫是用于交互式语音响应(IVR)系统(如图 5-8 所示, 它处理用户请求)还是进来呼叫是来自传真机。如果呼叫是用于 IVR, 则以预定的 IVR 电话号码完成呼叫。在这种情况下, 控制进入 22。如果进来的呼叫是来自传真机, 则控制进入步骤 2140。

在步骤 2140 和 2142 中, 呼叫处理器保留传真信道并在系统记录中(未示出)记录传真接收尝试。在步骤 2144 和 2146 中, 呼叫处理器接收传真消息并记录传真结果。然后, 将传真消息加到发送邮箱 1303。在步骤 2150 中, 呼叫处理器通过在呼叫传真机的 CSID(用户服务 ID(识别符))中的查找确定发出呼叫的传真机。另外, 可以由电话公司提供的呼叫器 ID 号码识别呼叫传真机(如果可得到呼叫器 ID 服务)。用户服务 ID 是从传统发送传真机发送的代码, 它识别发送传真机的传真号码。呼叫处理器一旦知道呼叫传真机的 CSID, 它也知道了用户的识别。然后呼叫处理器通过在用户的地址手册中观察所拨的号码(DID 或“直接向内拨号”)确定预定接收者的电子邮件地址。如上所述, 每个用户的手册有多个电子邮件地址与相应的多个 DID 号码有关。如果两个用户分享一台传真机作为他们的目的传

真机，则本发明的较佳实施例将指定互连网传真号码，因此两个用户的互连网传真号码不会重叠。因此，CSID 和互连网传真号码的结合可以用于识别用户。

在步骤 2152 中，将传真消息传送到图 10 的发件处理器 1004，在那里将其转换成图象文件并用电子邮件发送给预定的接收者。图 22 示出当在 EPO 中的呼叫处理器完成对来自用户的进来的 IVR 呼叫的处理时的步骤。如果在步骤 2202 和 2204 中，系统成功地保留了语音线，则呼叫处理器为用户的帐户号码和密码而提示用户。如果这些都有效，则呼叫处理器处置第一提示(见图 5-8 的用户提示树)并处理用户的响应。

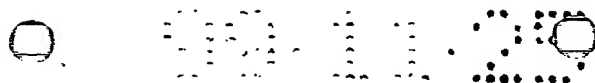
如果用户请求通过传真机将信息发送给用户的操作(诸如请求用户地址手册的清单)，则控制进入步骤 2212。在步骤 2212 中，如果请求是经调度的类型，则在步骤 2216 中将任务提交给调度程序。如果要立即完成任务，则控制进入图 21 的步骤 2108 并且将所请求的信息立即传真给用户。一个调度程序的例子是当呼叫者键入一个传真号码，他希望将他的页面发送到该号码。在一个立即的任务中，呼叫者正从他的传真机呼叫并在呼叫期间按“开始”按钮。

如果，用户请求包括该用户发送一传真(例如，远程发送)则控制进入图 21 的步骤 2140。否则，控制回到步骤 2208，处理更多的用户 IVR 请求。

在步骤 2108 中，如果待处理的消息是一发出的消息，则呼叫处理器保留传真信道，并为用户保留空闲源号码。在本发明的较佳实施例中，用户可以有一个以上的经登记的传真机。每一个经登记的传真机有一个源号码。如果一个经登记的传真机是忙碌的，则系统会依次试验每个经登记的传真机。步骤 2116 记录所尝试的传真发送而步骤 2118 和 2122 发送传真并记录传真结果。步骤 2124 将用于该源的 CSID 记录在源数据库中(未示出)。CSID 如此记录，如果系统得到来自有经记录 CSID 的传真机的呼叫，则它将用经记录的源来进行识别。(这是一实施的细节，增加该实施细节以处理这种情况，即传真机的 CSID 和它的传真号码不匹配)。

步骤 2126 指令图 19 的确认器确认成功的传真。注意，步骤 2108、2112、2118 或 2126 的任何一个步骤的失败会造成发出的传真消息在晚一些时候再排队和再试验。

图 23 是示出由图 10 的 EPO 请求处理器 1008 完成的步骤的流程图。处理器 1008 与 EPO 相互作用以交换用户 ID。在步骤 2302 和 2304 中，处理器接收来自



EPO 的请求并确定其类型。如果请求是要改变用户 ID，则，在步骤 2306 中，在 SMTP 邮件服务器 204 中增加或改变指定的用户 ID。图 24 示出在用于本发明的较佳实施例中的排队数据结构中的“任务”入口的示例格式。如上所述，使用图 24 的格式，在排队中输入待发送的每一个任务。如果用户的保留消息是待发送的，则使用图 24 的格式，系统为所保留的消息建立一个排队入口。提供图 24 的格式仅为示例的目的。只要不偏离本发明的范围，可以采用其它合适的处理消息的方法。在图 24 中，每个排队入口最好包括一个用户 id 号码(以识别用户)、一个传真号码以拨号把传真发送给用户、一个传真的文件/消息(可以是正文或 TIF)、和一定数量的以前各种可能类型的失败。

V. 字母数字字符的非-多义性入口

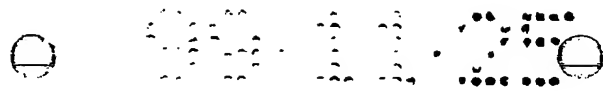
一个本发明的较佳实施例允许用户通过按键电话输入字母数字信息，诸如电子邮件地址。大多数手持电话机的手持送受话器上有字母 A-P 和 R-Y。虽然可以使用任何的数，但在传统上，将数“1”用作为字母“Q”和“Z”。当用户按键一次、二次或三次时，所述实施例使用第一种，疑问音调变化来响应字符。在用户按“终止”键后，系统使用第二种，声明的音调变化来指示系统已经接收字符。

图 25(a)示出系统完成的步骤的示例，允许用户通过按键电话的键盘输入字母数字字符，当系统将字符讲述两次时，使用户不会弄错。也可以将上述方法用于用户用键盘输入信息的其它类型的系统。

在步骤 2502 中，用户按一键，诸如“2”键一次。系统(假定在下次按键之前还有足够的时间)用第一种音调变化，诸如疑问音调变化，发出一次-按键字符(例如，“A”)的声音。疑问音调变化暗示系统尚未接受发出声音的字符和等待更多的输入。

如果在步骤 2506 中，用户再按同一个键，在步骤 2508 中，系统(假定它有足够的时间)用第一(例如，疑问)音调变化发出二次-按键字符(例如，“B”)的声音。如果作为替代，在步骤 2504 中用户按“终止”键(诸如“#”)，则控制进入图 25(b)的步骤 2530。如果，在任何时间，用户按不同的键(没有先按“终止”键)，则控制进入图 25(c)的步骤 2550，它使控制返回步骤 2502，所以对于新按的键可以重复处理。

如果，在步骤 2512 中，用户再按相同的键，在步骤 2514 中，系统(假定它有



足够的时间)用第一(例如, 疑问)音调变化发出三次-按键字符(例如, “C”)的声音。如果作为替代, 在步骤 2510 中用户按“终止”键, 则控制进入图 25(b)的步骤 2530。

如果, 在步骤 2518 中, 用户再按相同的键, 在步骤 2520 中, 系统(假定它有足够的时间)用第一(例如, 疑问)音调变化发出四次-按键字符(例如, “2”)的声音。如果作为替代, 在步骤 2516 中用户按“终止”键, 则控制进入图 25(b)的步骤 2530。

如果, 在步骤 2524 中, 用户第五次按键, 控制进入重复该处理的步骤 2502。如果, 在按该键四次以后, 在 2522 中用户按“终止”键, 则控制进入图 25(b)的步骤 2530。

在步骤 2530 中, 用户已经按一个键一、二、三或四次, 并且已经按了终止键, 指示用户希望输入所指示的字母数字字符。在这情况下, 系统用第二种, 声明的音调变化, 诸如稳定的(或下降的)音调变化来响应所指示的字母数字字符。声明的音调变化暗示系统已经接受用户的输入。第一和第二音调变化的不同为用户提供声音的暗示, 这是两次响应字符的原因(当用户初次按键的一次和当用户指示他希望输入字符的一次)。如此的声音暗示使用户不会弄错并增加用户在系统中输入的正确度。

总之, 本发明使有使用单台传真机机会的用户能方便地发送和接收电子邮件。如果用户选择“直接接收”的接收模式, 可使电子邮件自动地发送到他的传真机, 并可打印和读出。如果用户选择“按要求接收”, 用户呼叫一预定的电话号码并回答语音提示以指示系统将他的未读出电子邮件传真到哪里。在各种情况下, 由用户接收的传真包含预定给用户的电子邮件消息的内容。为了从用户的传真机发送电子邮件, 他建立电子邮件地址的“地址手册”, 每个电子邮件地址和一个传真号码有关(互连网传真号码)。如果用户将传真消息发送到与在用户的地址手册中的特定接收者有关的互连网传真号码, 则系统将包含传真消息内容的电子邮件消息发送到与互连网传真号码有关的接收者。

从这里所揭示的本发明的详细说明和实践的考虑, 对熟悉本领域的人来说, 其它实施例将是显而易见的。这里的详细说明和例子仅考虑为示例, 由以下的权利要求及等同内容表示本发明的真正范围。

说明书附图

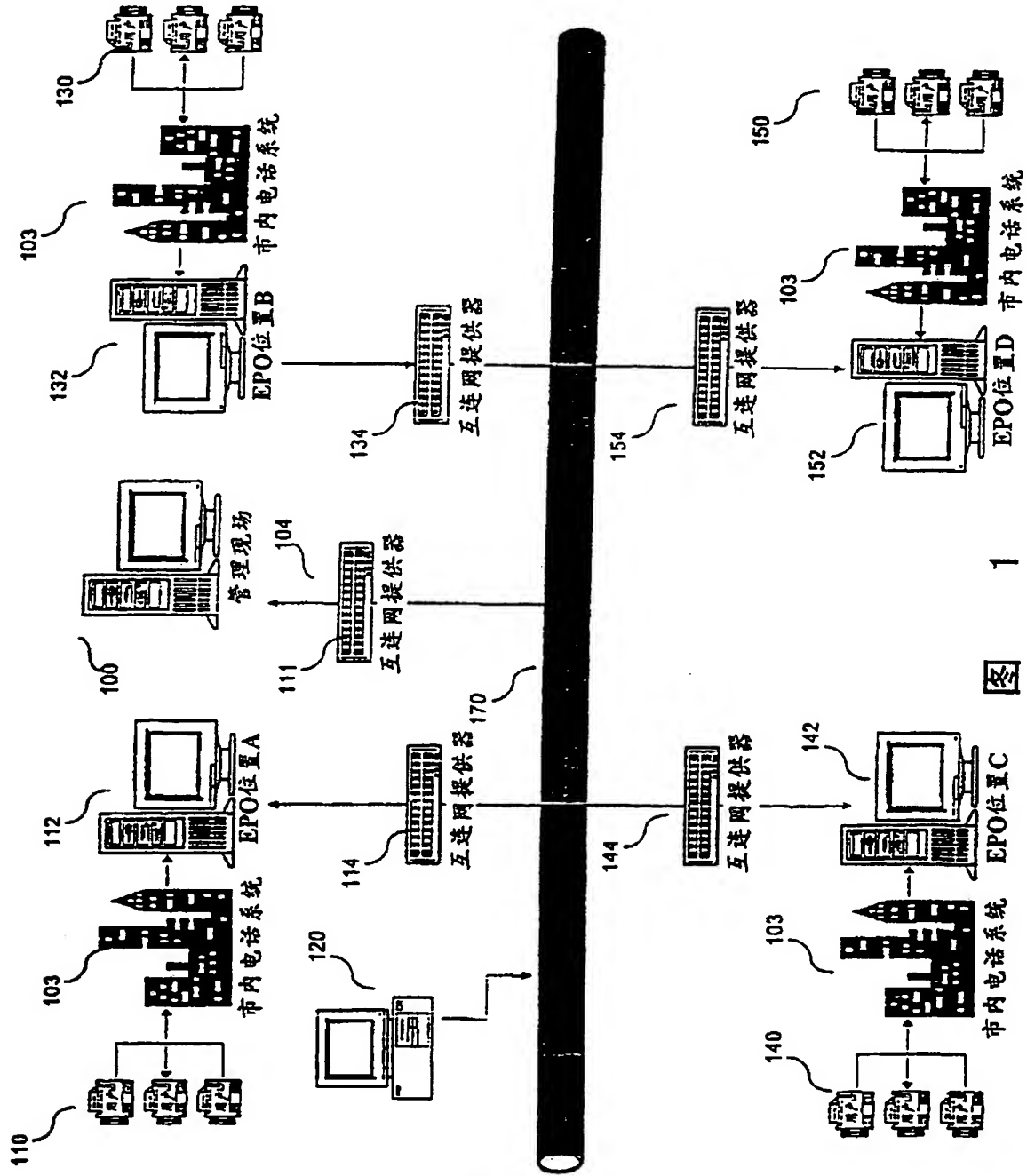
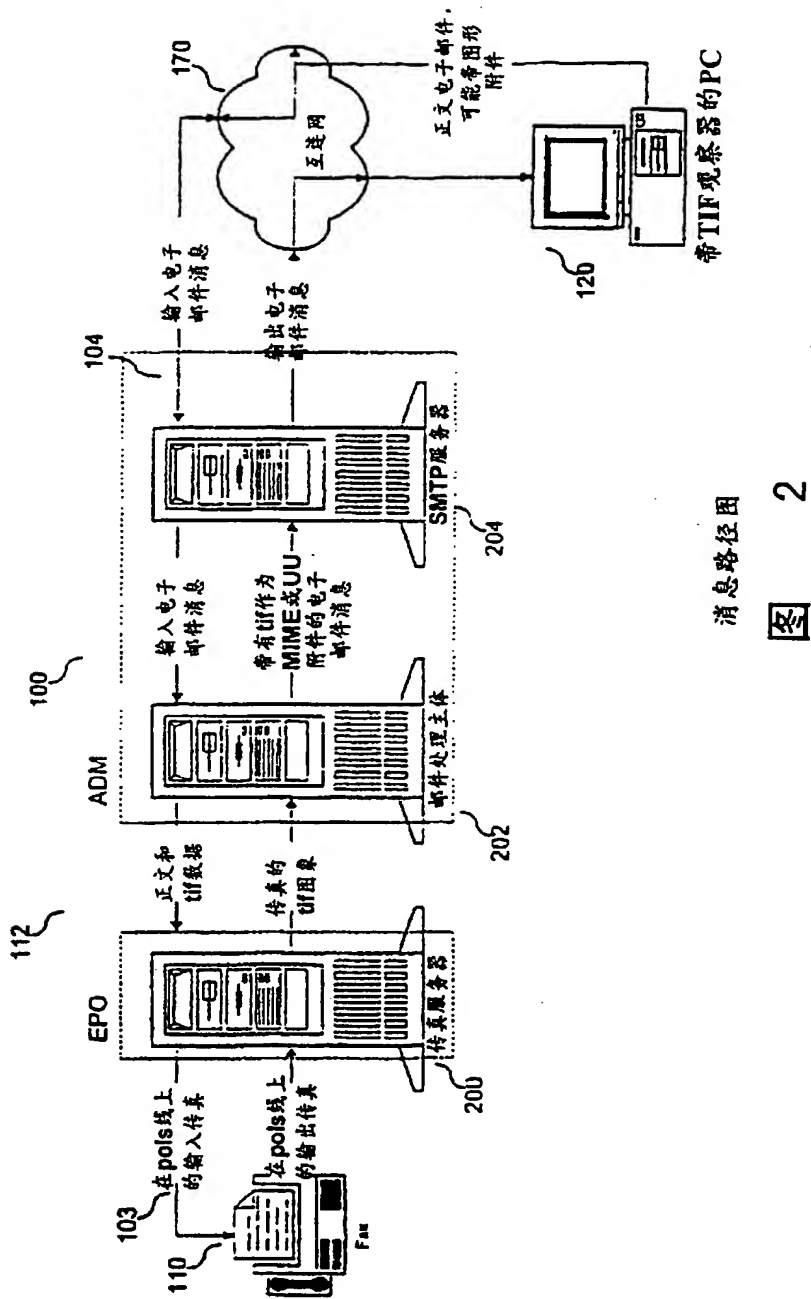


图 1



消息路径图

图 2

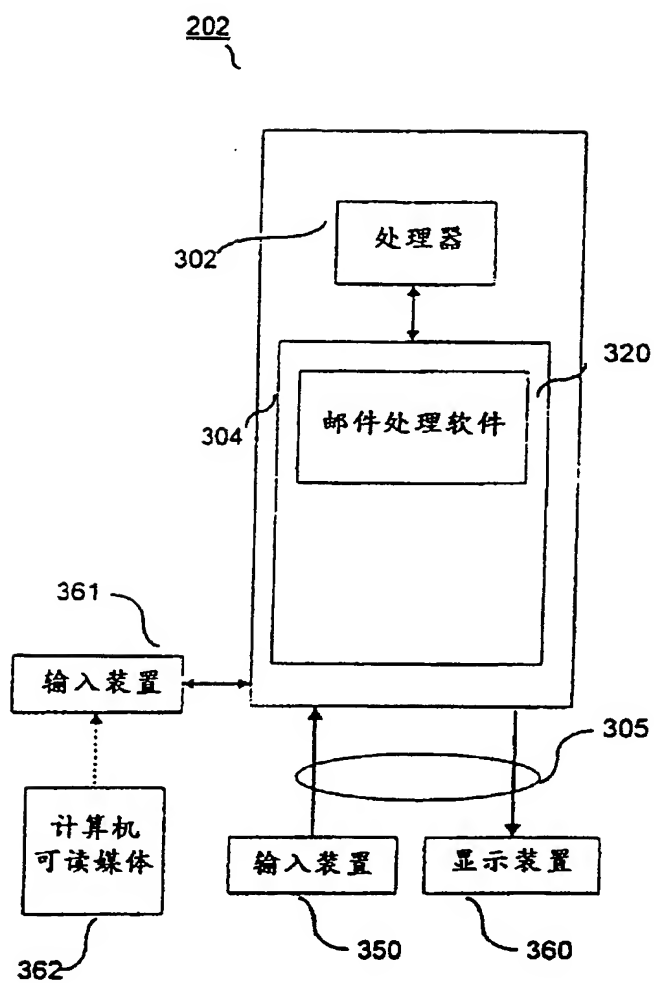


图 3

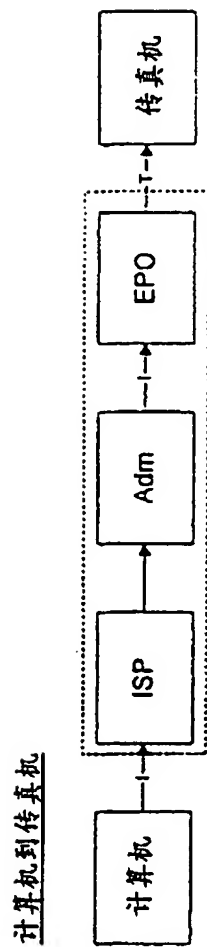


图 4(a)

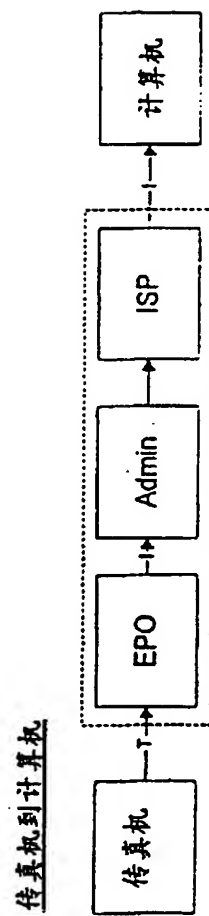


图 4(b)

传真机到传真机

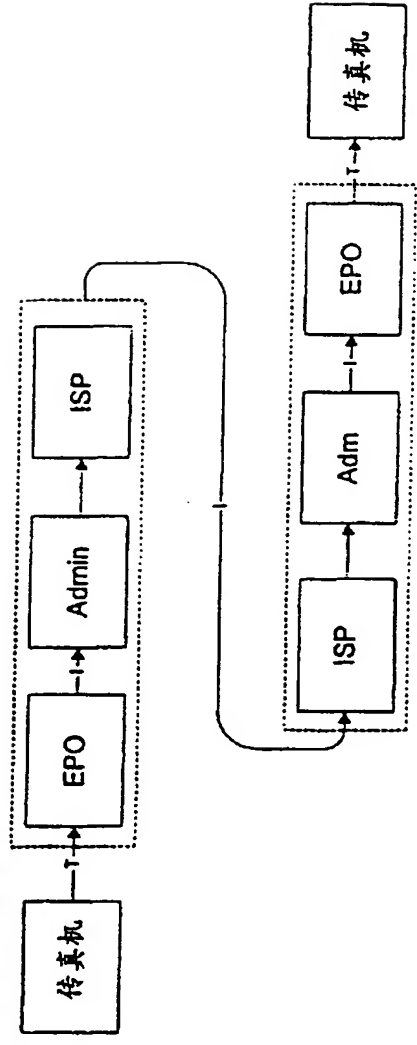


图 4(c)

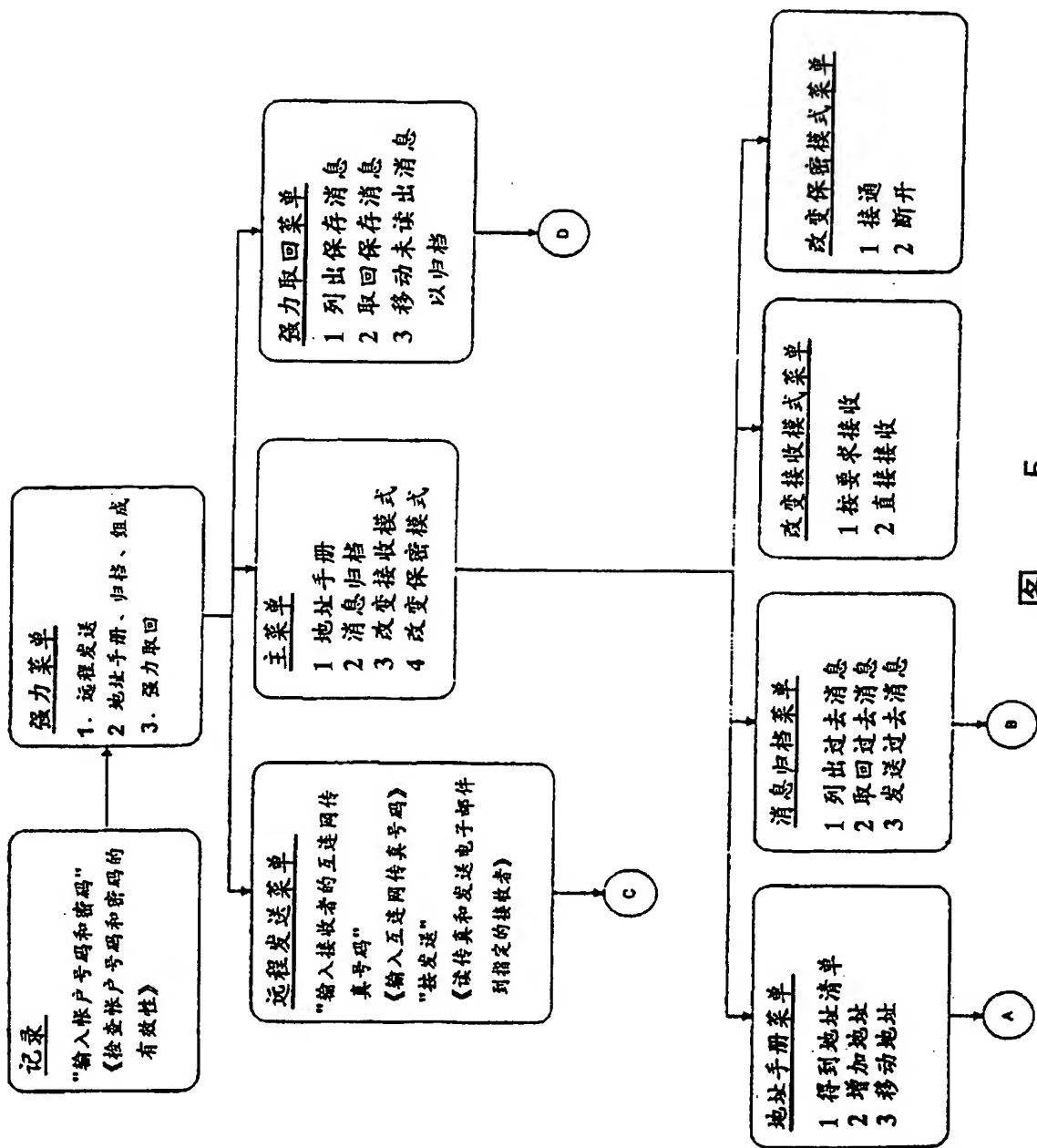


图 5

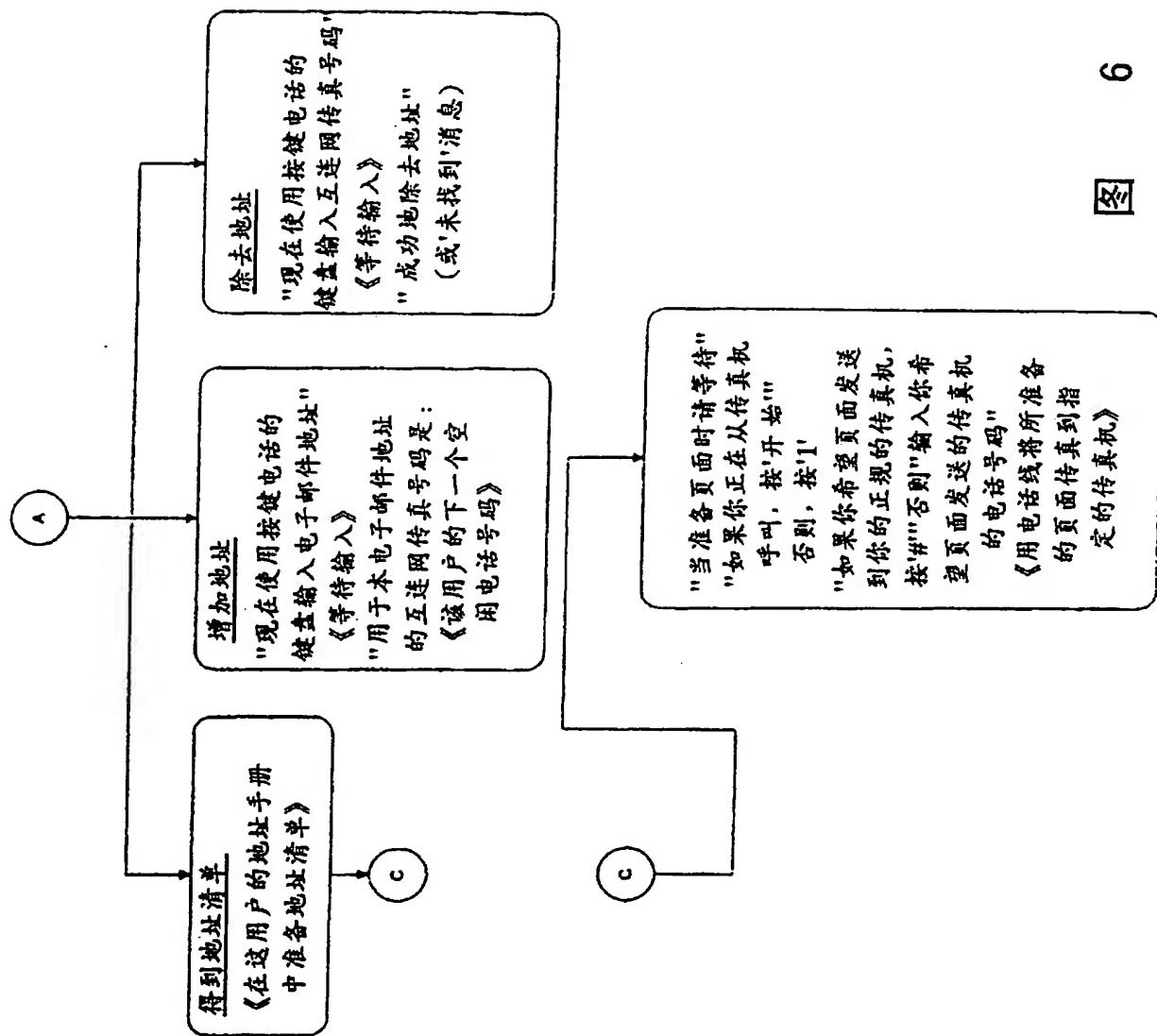


图 6

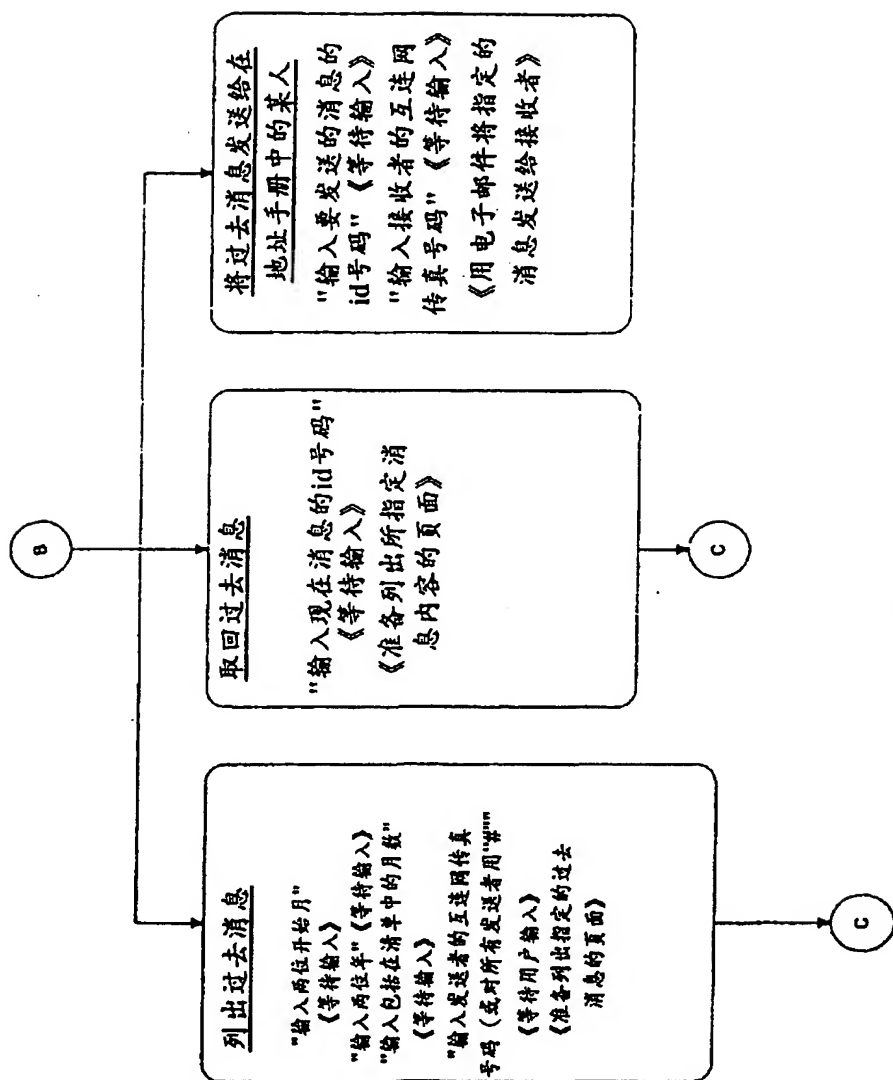


图 7

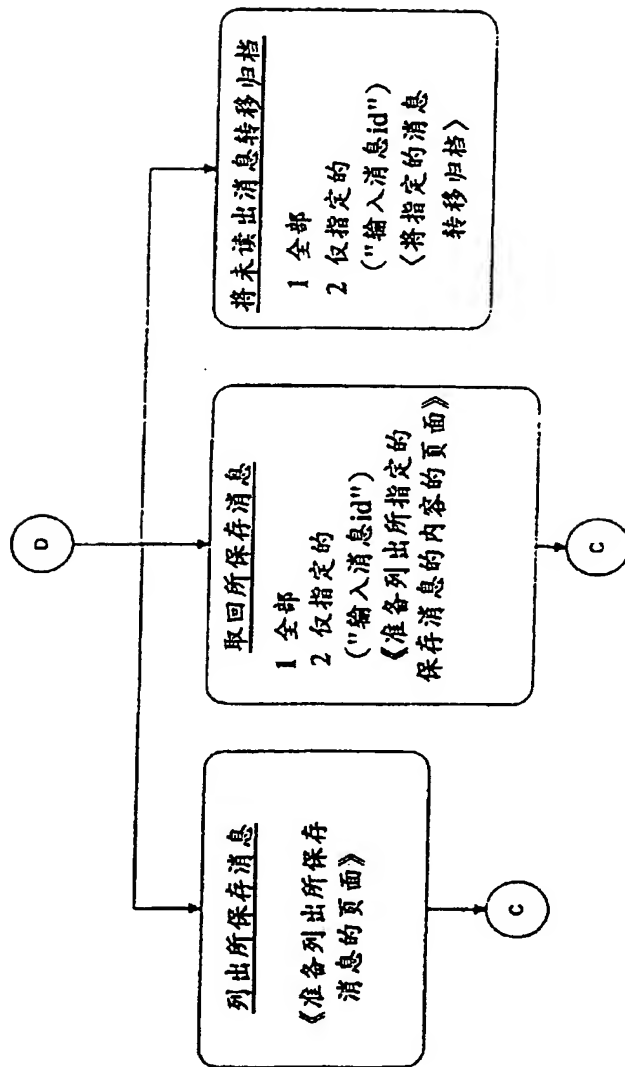


图 8

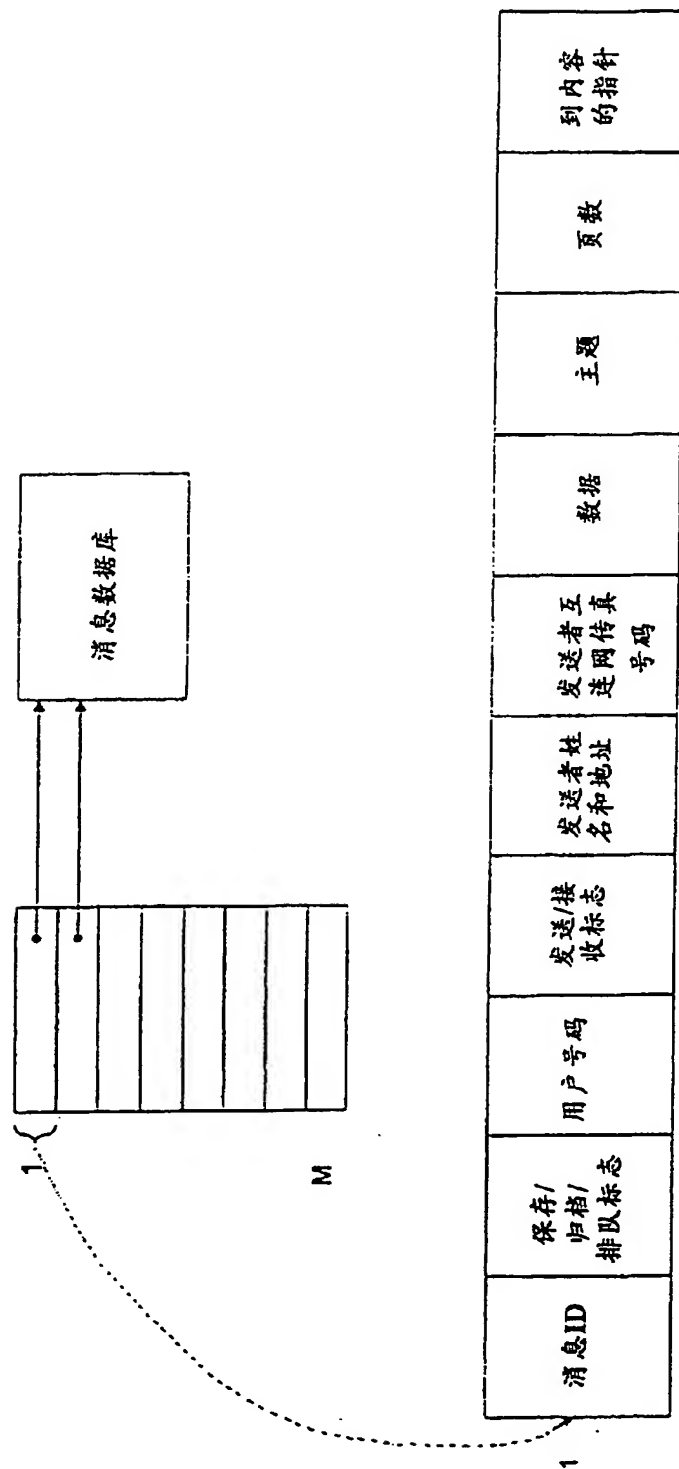


图 9(b)

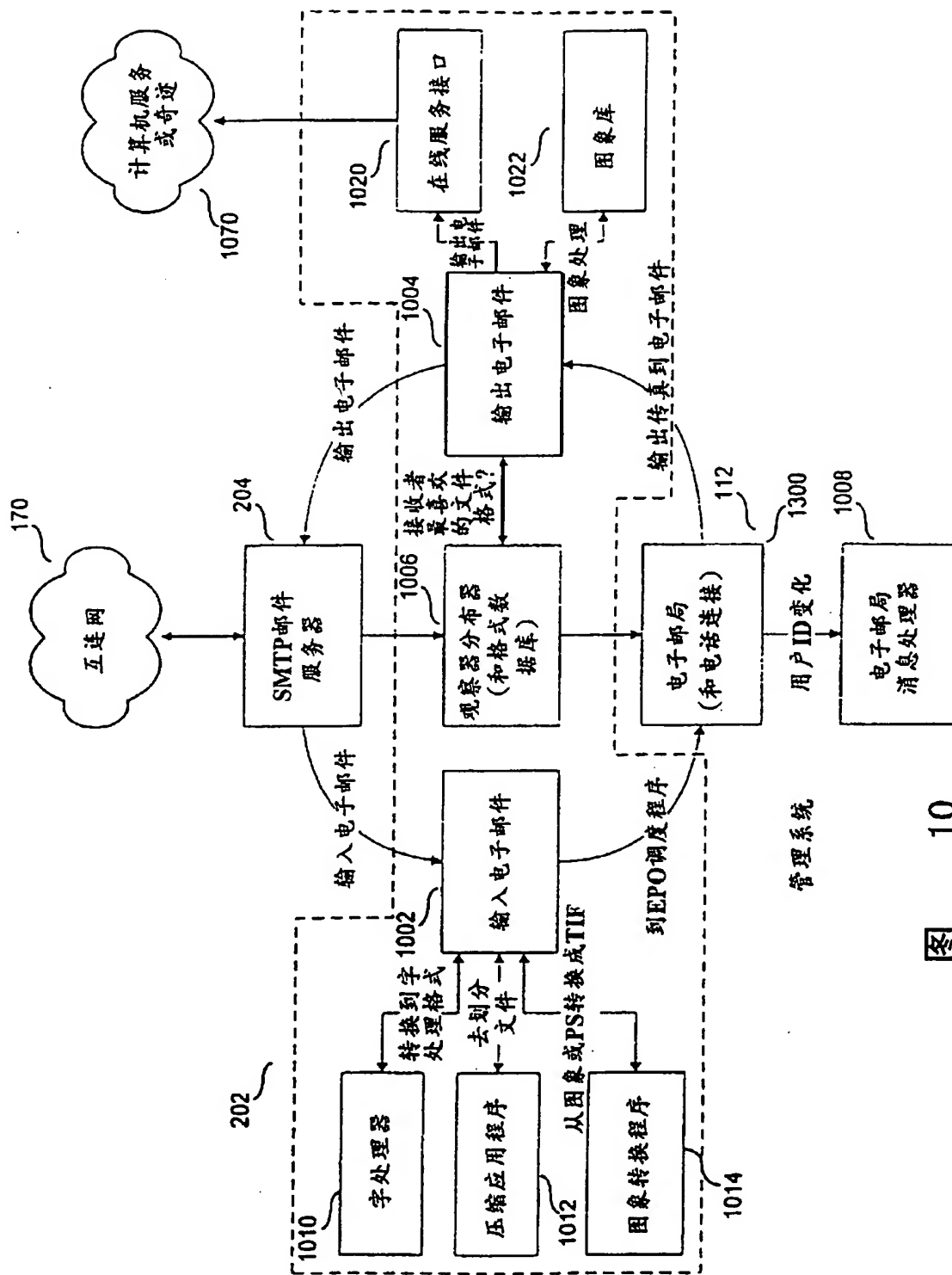
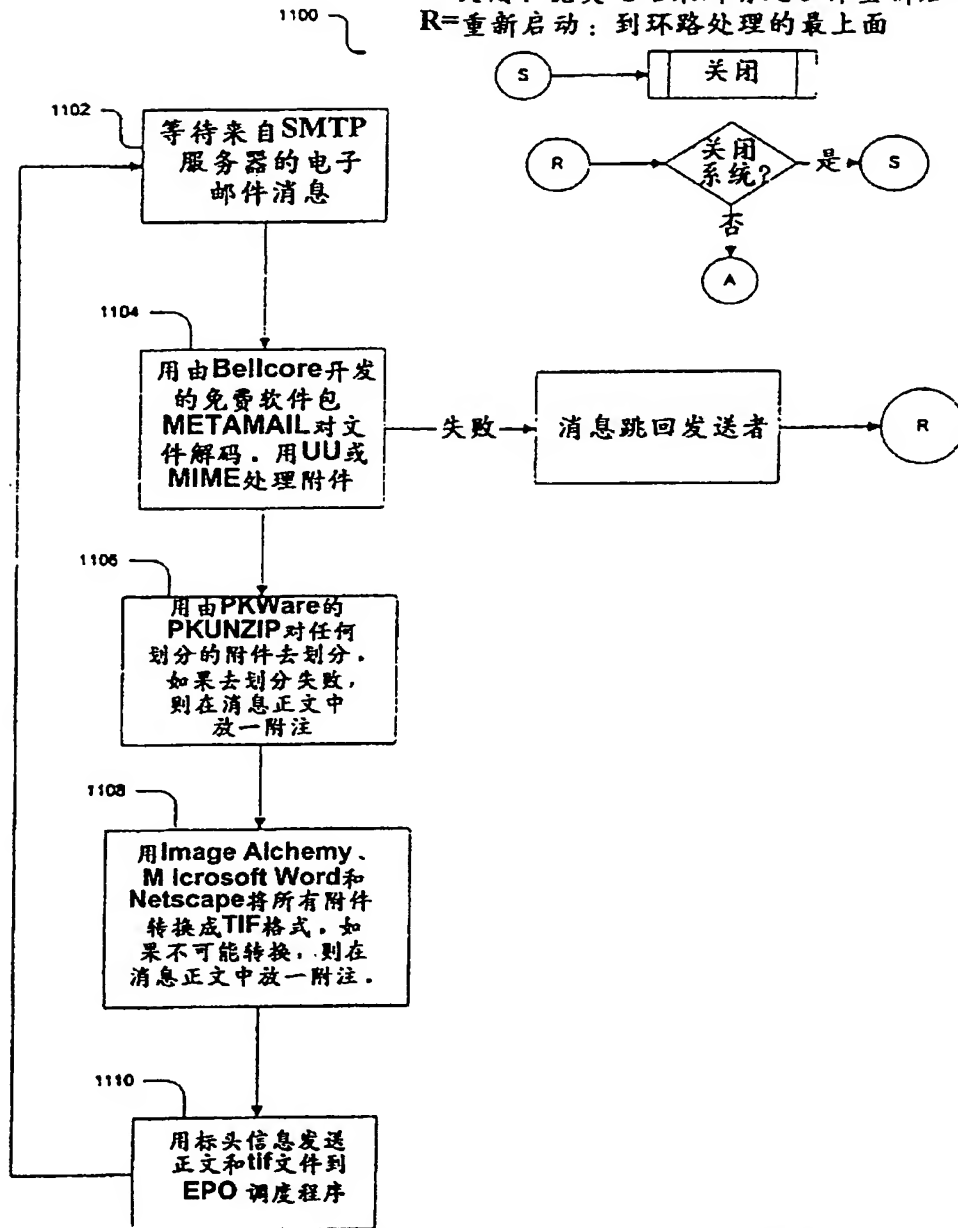


图 10

输入电子邮件

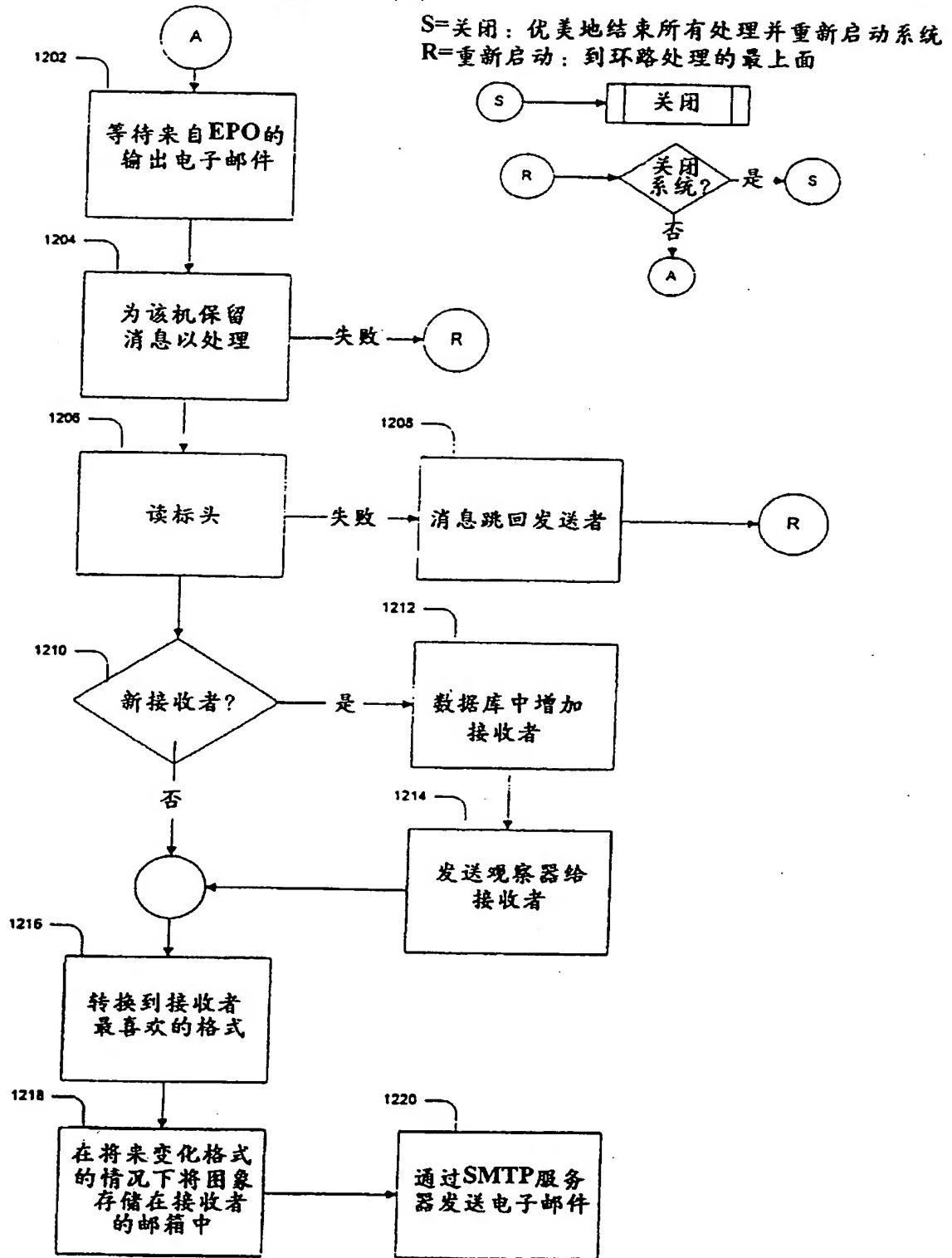
S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面



输入电子邮件（电子邮件到传真）

图 11

输出电子邮件



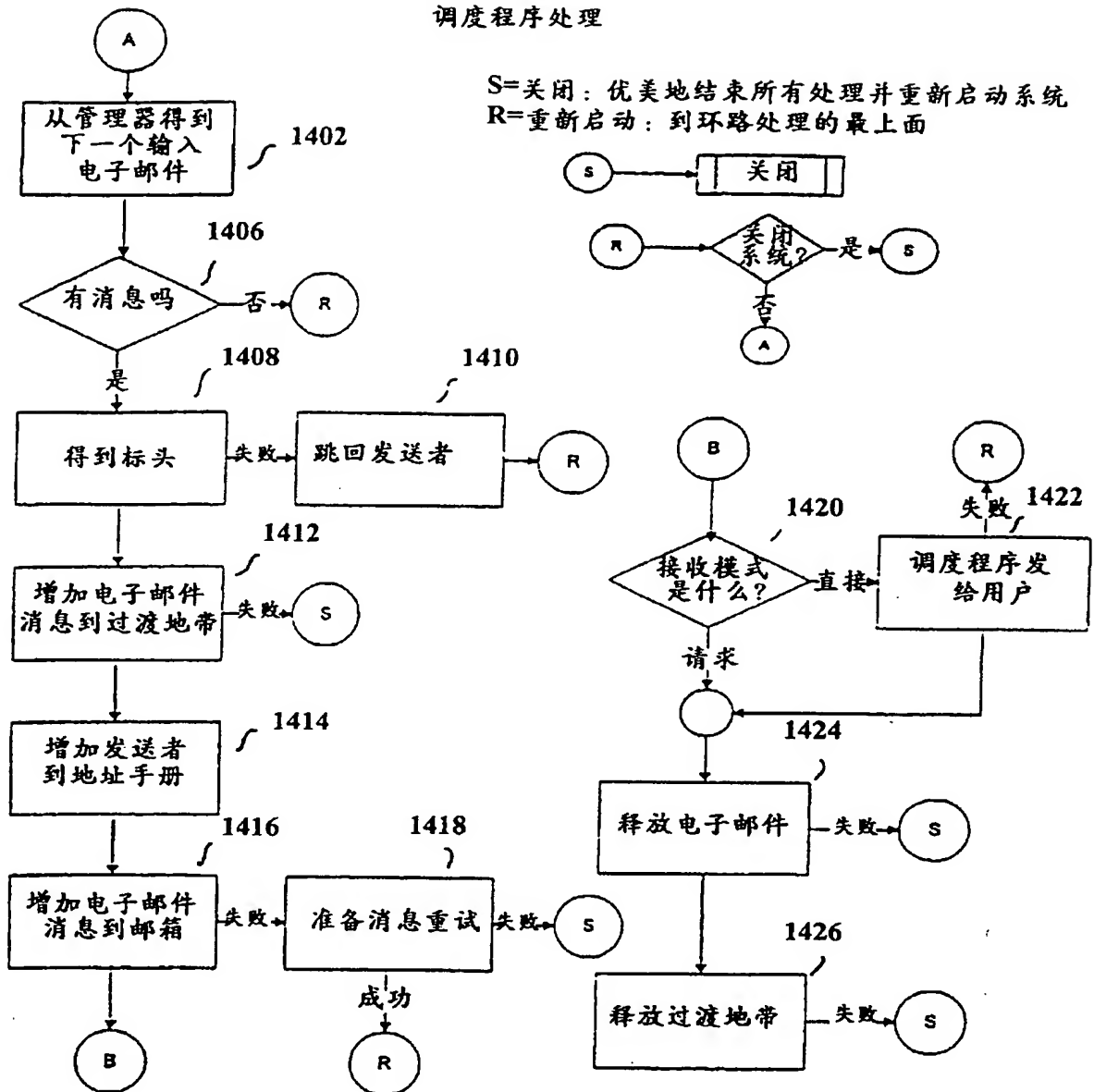
输出电子邮件 (传真到电子邮件)

图 12



调度程序处理

S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面



定时器

S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面

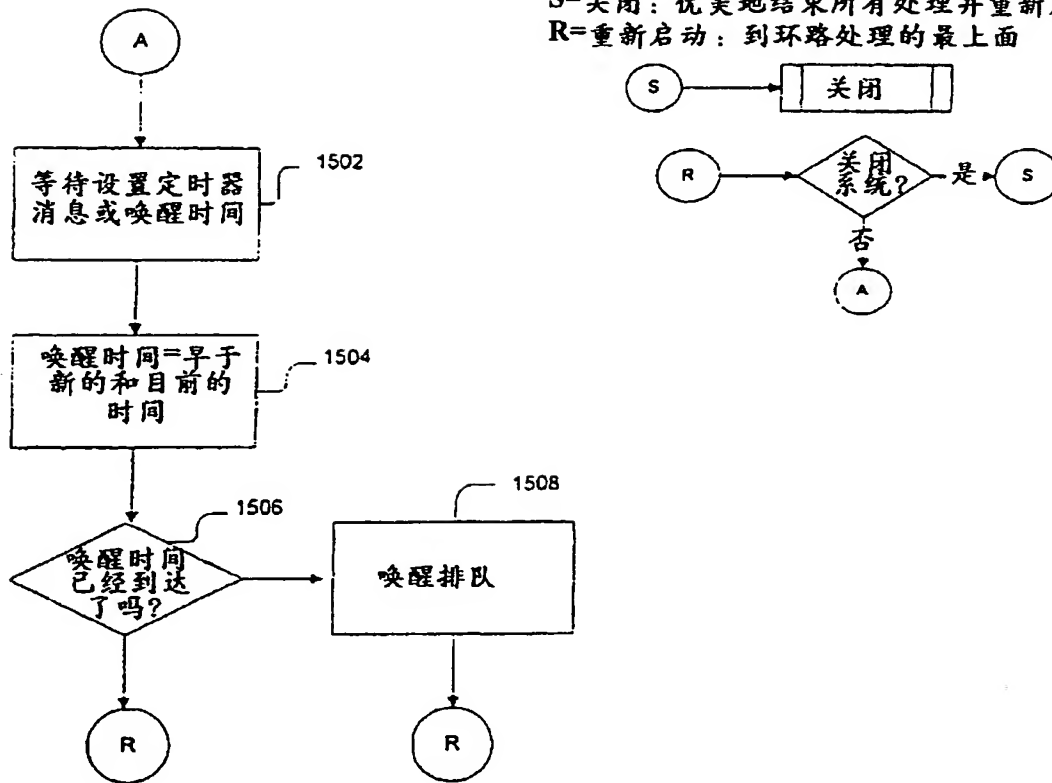


图 15

排队处理器：编队器

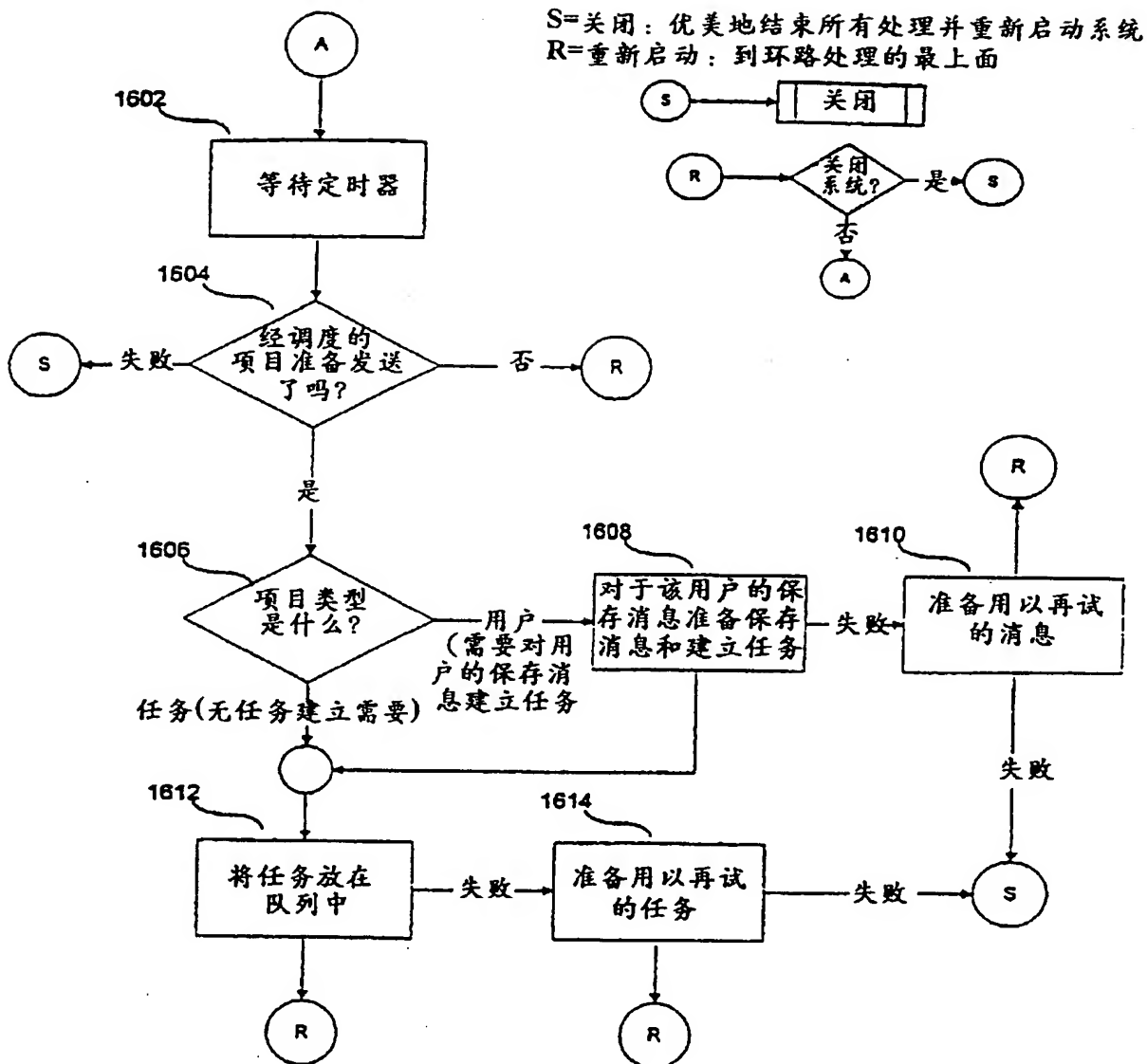
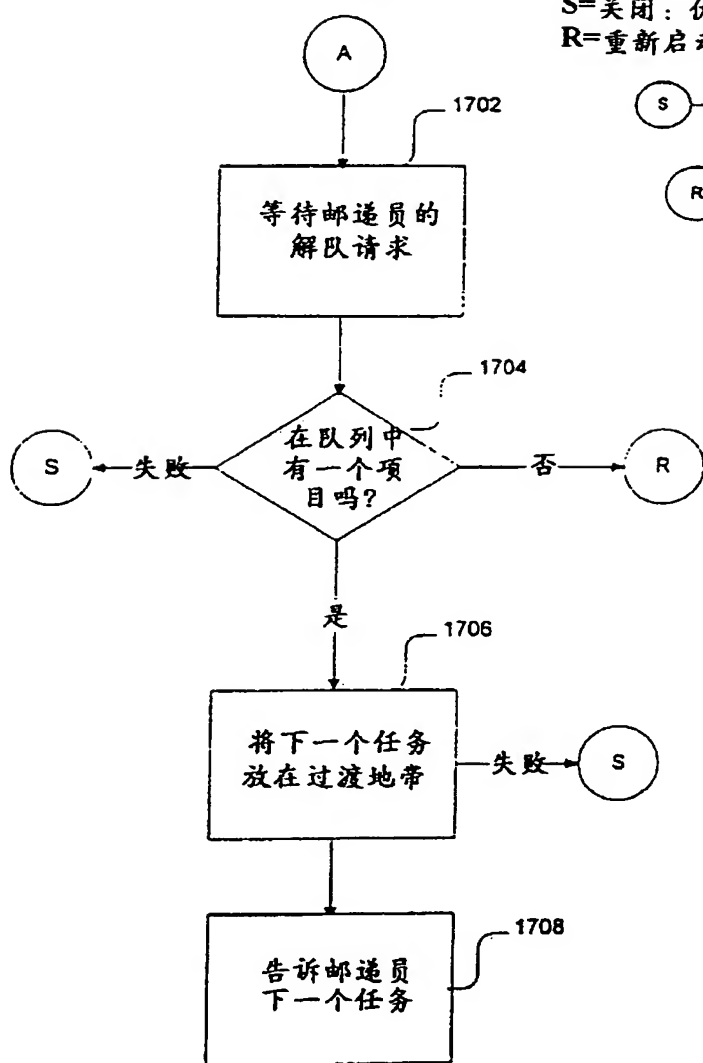


图 16

排队处理器：解队器



S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面

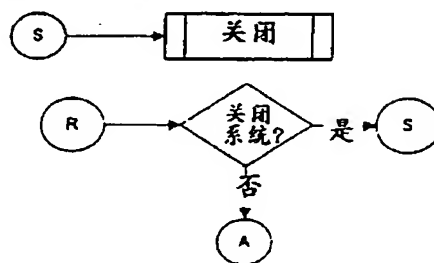


图 17

排队处理器：再排队器

S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面

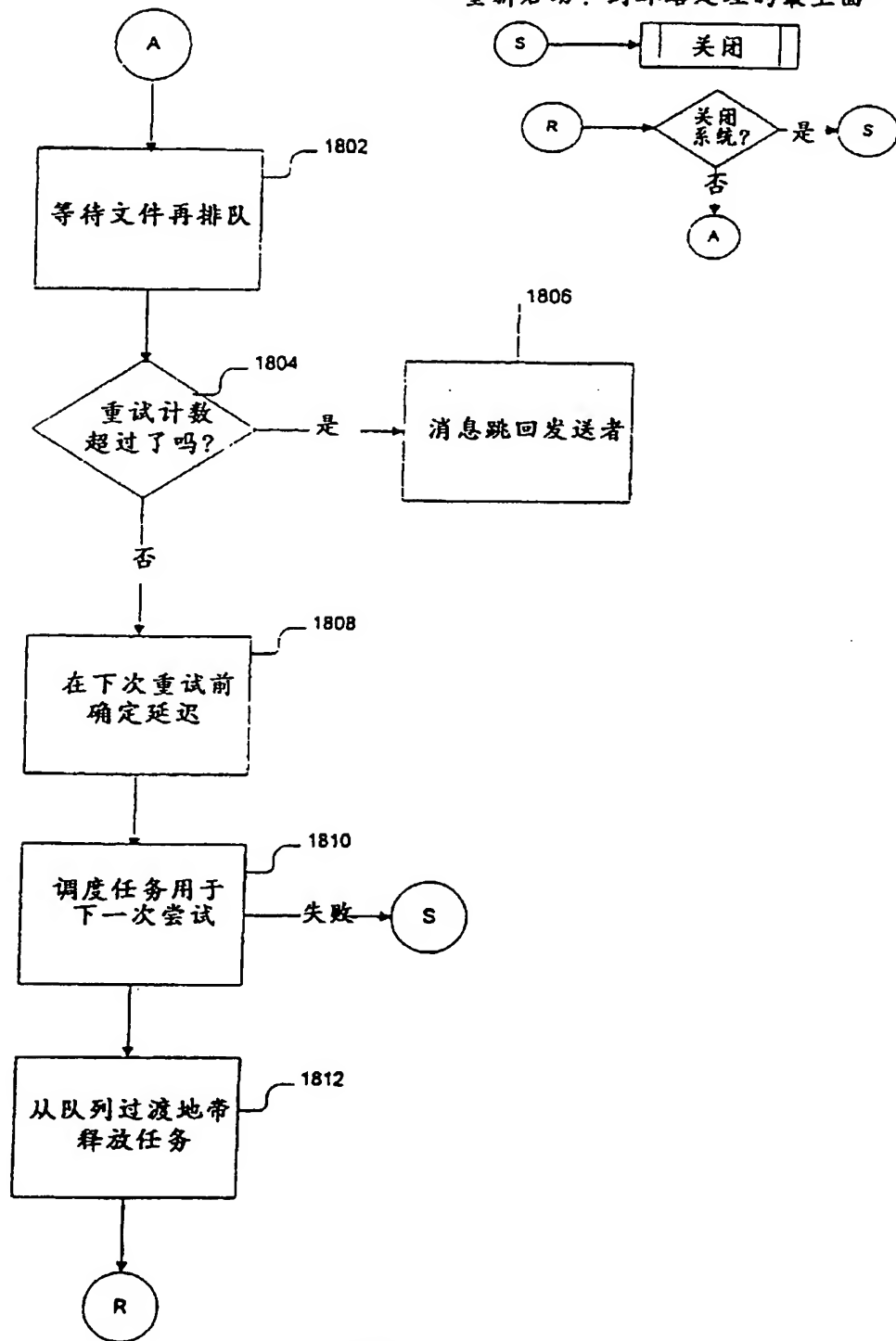


图 18

排队处理器：确认器

S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面

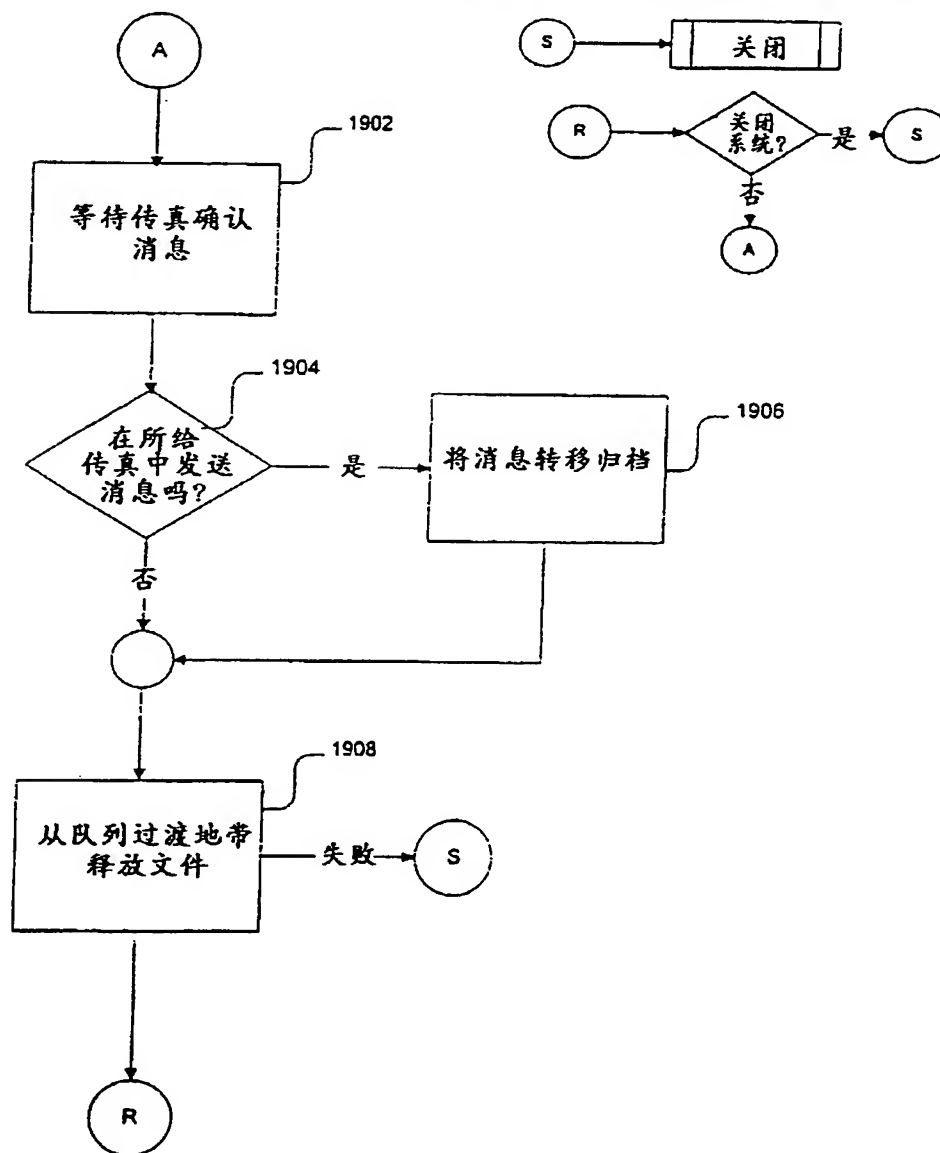


图 19

邮递员

S=关闭：优美地结束所有处理并重新启动系统
R=重新启动：到环路处理的最上面

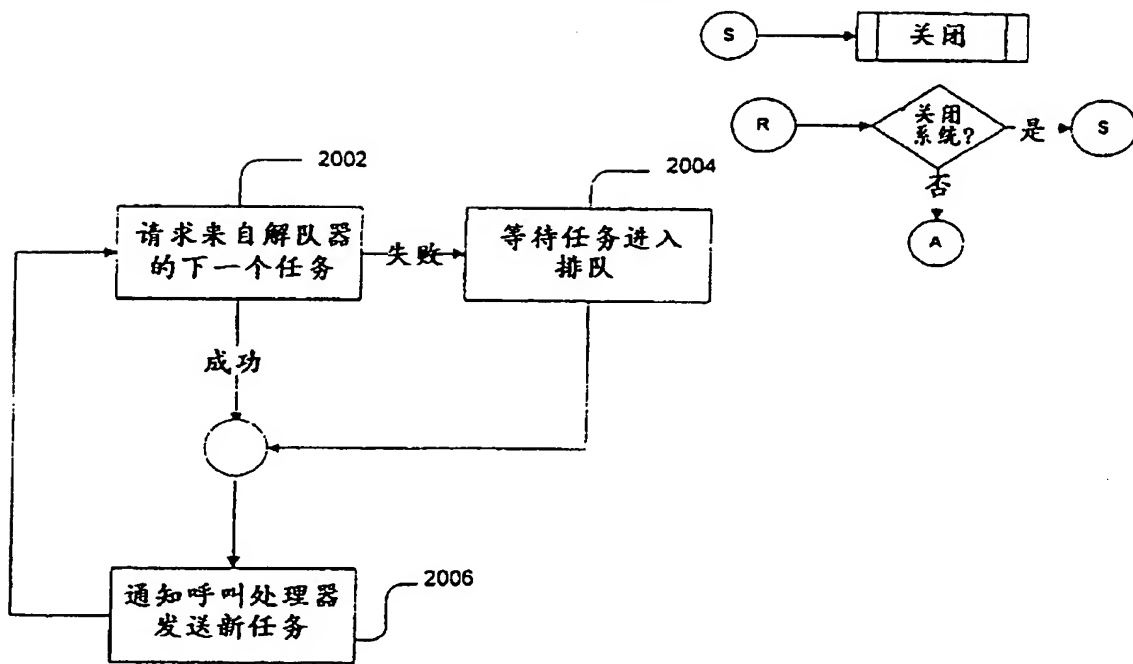


图 20

呼叫处理器 (每根电话线一个)
(第一页, 共二页)
传真子系统

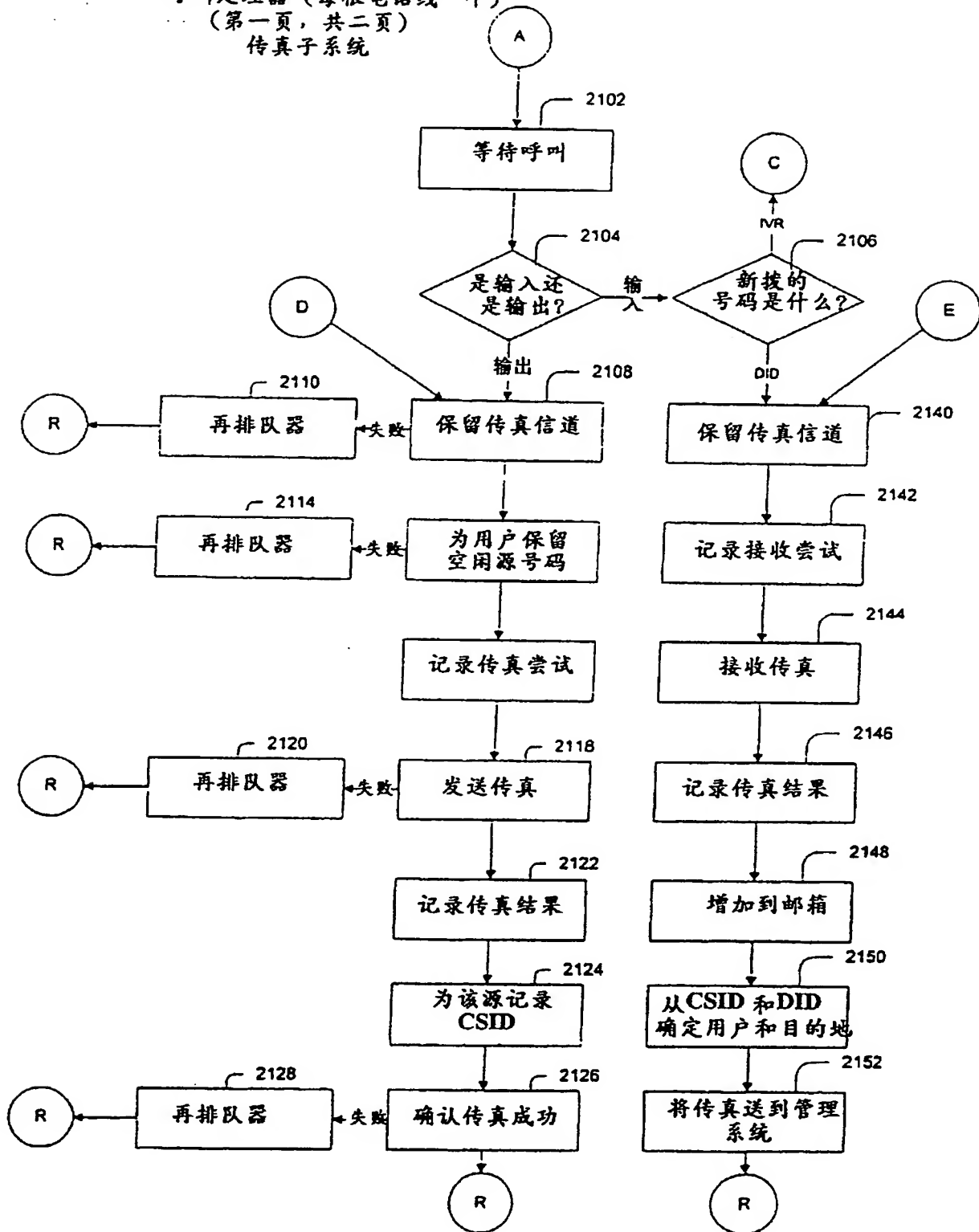


图 21

呼叫处理器 (每根电话线一个)
(第二页, 共二页)

IVR子系统

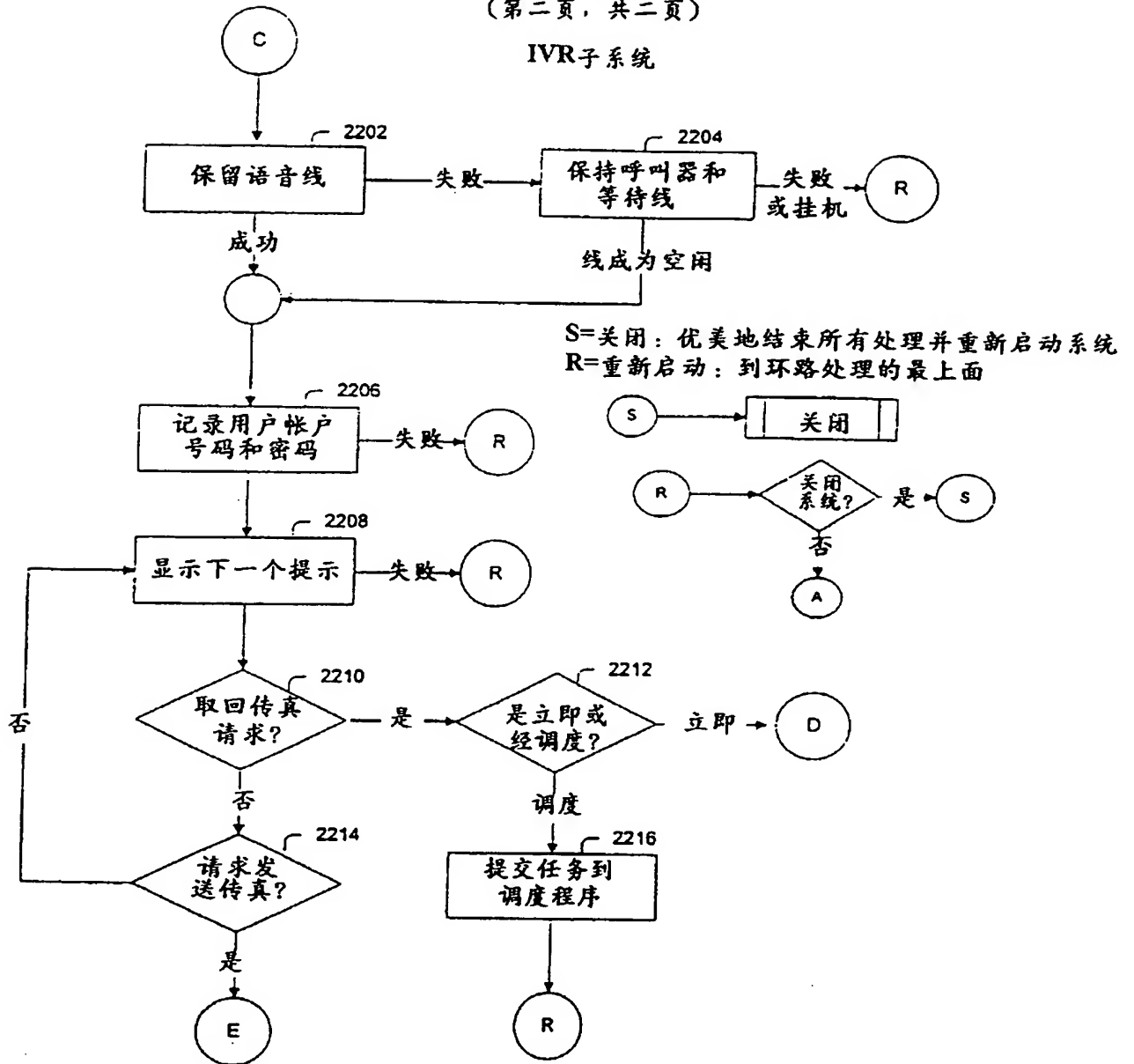


图 22

EPO请求处理器

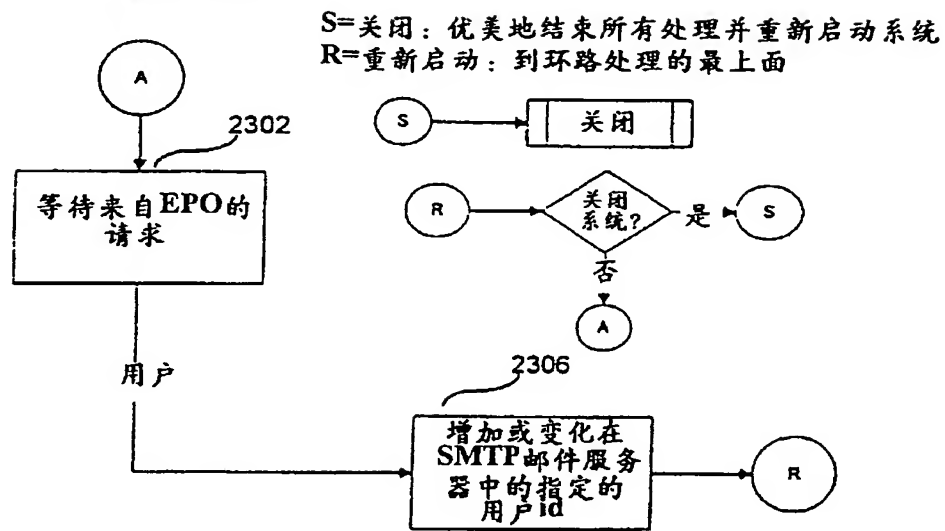


图 23



用户 (ID号码)
拨号发送给用户的传真号码
要传真的文件(正文或TIF)
以前每种类型的失效数 (忙碌、离线、出故障)

任务排队输入的格式

图 24

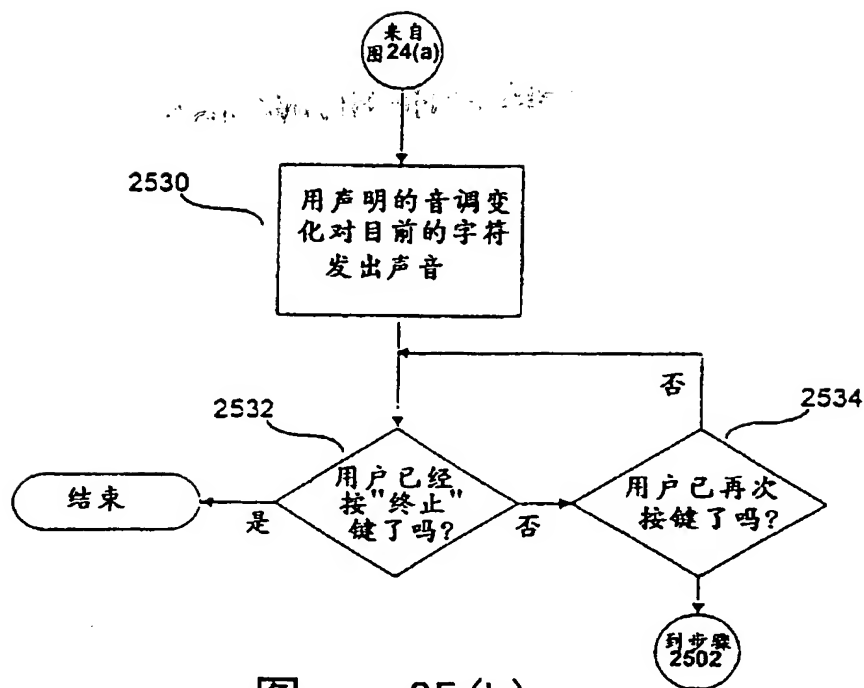


图 25(b)

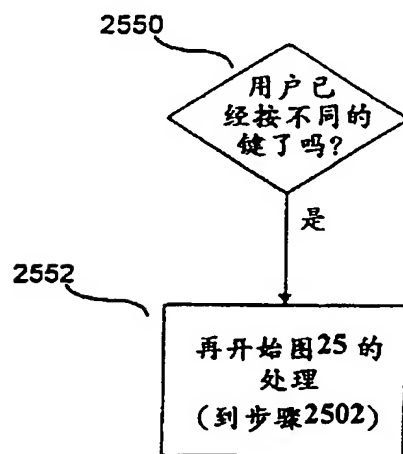






图 25(c)

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Patent number: CN1269094
Publication date: 2000-10-04
Inventor: RACHELSON T A [US]
Applicant: CENTRIC INC E [US]
Classification:
- international: H04N1/21; H04N1/29; H04N1/34;
H04M11/00
- european:
Application number: CN19980805256 19980515
Priority number(s): US19970858779 19970519

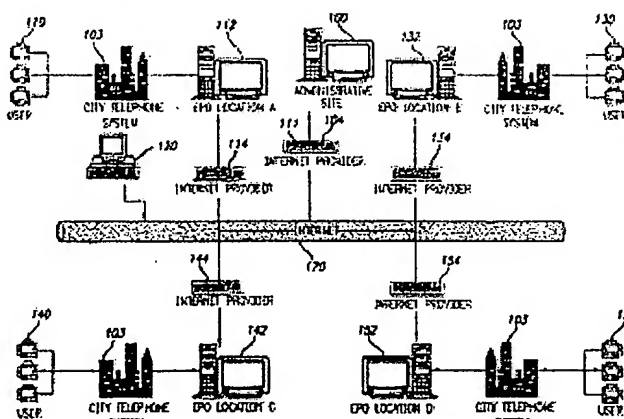
Also published as:

 WO9853603 (A3)
 WO9853603 (A2)
 WO9853603 (A2)
 US6157706 (A1)

Abstract not available for CN1269094

Abstract of corresponding document: **US6157706**

A method and apparatus that allow users having access to a facsimile (fax) machine to send, receive, and manage e-mail easily. If the user selects a "Direct Receipt" receive mode, e-mail is automatically sent to his fax machine, where it is automatically printed out and can be read. If the user selects "Receipt on Demand" mode, the user calls a predetermined telephone number and answers voice prompts to instruct the system where to fax his (held) unread e-mail. The user can also be notified of unread e-mail being held, via pager or telephone. In either case, the fax received by the user contains the contents of the e-mail message intended for the user. To send e-mail from his fax machine, the user uses an "address book" of e-mail addresses, each of which is associated with a fax telephone number (also called an "internet fax number"). If the user sends a fax message to an internet fax number associated with a particular recipient in the user's address book, the system sends an e-mail message containing the contents of the fax



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Description of corresponding document: US6157706

FIELD OF THE INVENTION

This application relates to telecommunications and, specifically, to a method and apparatus for enabling a facsimile machine to behave as an e-mail client.

BACKGROUND OF THE INVENTION

In recent years, e-mail has become extremely popular. People with a personal computer can send and receive e-mail messages to and from other computer users. In addition, people can use their personal computers to send e-mail to multiple users at once.

E-mail has several advantages over other methods of sending information. It is cheap, since e-mail messages can be sent anywhere in the world over the internet at no incremental cost. E-mail is efficient, because it can be broadcast to a few or to thousands of people quickly and effortlessly. E-mail maintains the quality of the message. The readability and sharpness of the message remains the same no matter how many times it is sent. E-mail is auditable because messages can be saved or logged for easy access. E-mail is private, as long as individuals have their own separate e-mail addresses protected by their own password. Lastly, e-mail is schedule-free because users do not have to coordinate schedules to conduct e-mail correspondence.

Unfortunately, not all people in the world have access to a computer. Some people do not have access to a computer at any time. These people cannot send or receive e-mail via conventional methods. Other people do not have a portable computer that they take with them when they leave their home or office. These people are cut off from their e-mail when they travel. Most people, however, usually have access to a facsimile (fax) machine. Since many conventional computers can send faxes over the telephone lines, conventional computers can send faxes to persons having a fax machine.

One problem with sending a conventional fax, however, is that the recipients at the fax machine cannot send return e-mail, since they do not have access to a computer. While people with a fax machine can send faxes that can be received by a computer, the receiving computer must be active in order to receive the fax. The convenience of e-mail, where a recipient can receive e-mail whether or not he is aware that it is coming is not available for faxes sent to/from a PC.

Another problem with sending a conventional fax from a computer, instead of just sending e-mail, is that the procedures for sending a fax from a computer and for sending e-mail from a computer are different. Thus, a sender at a computer has to remember that a specific recipient needs to be sent a fax (as opposed to e-mail) and to use the correct sending procedure. This is not convenient for the sender.

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fax can incur long distance charges while sending e-mail via a network such as the internet only incurs network usage charges, which do not vary with the amount of data sent.

Moreover, if an entire office at the fax recipient's end has only a single fax machine, it is not possible for a sender to direct the fax to a specific person for private reception. What is needed is a way for owners of fax machines to easily send and receive e-mail that is, at the same time, transparent to persons using a computer to send and receive e-mail.

Many telephonic information systems allow the user to enter alphanumeric characters using the keys of a touchtone telephone. Many users find this method of entering characters confusing. What is needed is a way of allowing the user to enter an alphanumeric character via a touch tone keypad without causing confusion.

SUMMARY OF THE INVENTION

The present invention overcomes the problems and disadvantages of the prior art by allowing users having access to a facsimile (fax) machine to send and receive e-mail easily. Specifically, the present invention allows a fax machine to behave like an e-mail client. An e-mail client is a mechanism through which one can send and receive electronic messages. An e-mail client can also manage past messages.

In a preferred embodiment of the present invention, the user can select one of two receive modes for receiving his e-mail. If the user selects a "Direct Receipt" receive mode, received e-mail is automatically sent to the user's designated fax machine, where it is printed out immediately. In contrast, if the user selects a "Receipt on Demand" receive mode, the user calls a predetermined telephone number and answers voice prompts to instruct the system where to fax his unread e-mail. Optionally, the user can be automatically notified that a message is waiting (either via pager or via a telephone message). In either case, the fax received by the user contains the contents of the e-mail message intended for the user.

Sending e-mail is also simple. The user establishes an "address book" of e-mail addresses of potential e-mail recipients or sets of recipients (such as a mailing list). Each e-mail address in the address book is associated with a fax number (also called an "internet fax number"). If the user faxes a message to a telephone number associated with a particular recipient in the user's address book, the system sends an e-mail message containing the contents of the fax message to the e-mail address of the recipient(s) associated with the internet fax number.

Entries are made in a user's address book in two ways. An entry is made when a user receives e-mail from someone for the first time. In this case, the sender's e-mail address is added to the recipient's address book, and a facsimile number (an internet fax number) is associated with the e-mail address. The user can also make entries in his address book by calling a predetermined telephone number and responding to voice prompts to manually enter a new e-mail address to be placed in his address book. The system will vocally inform the user of the internet fax number associated with the entered e-mail address, and printed on the faxed

In a preferred embodiment, e-mail faxed by a user is sent to the recipient in a graphical format, such as GIF, TIF, or PostScript (for easy printing). Thus, the user can e-mail graphics to another person by faxing them to the recipient's internet fax number.

In accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a system that enables a facsimile machine to behave like an e-mail client, comprising: a portion that receives an e-mail message addressed to a first user from a second user, the e-mail message including the e-mail address of the second user; a portion that stores the e-mail address of the second user in a memory; a portion that associates a unique code with the stored e-mail address of the second user; and a portion that, when the system receives a facsimile message from the first user and the facsimile message is associated with a code that is the unique code assigned to the second user's stored e-mail address, sends the contents of the facsimile message to the e-mail address of the second user.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a system that enables a facsimile machine to behave like an e-mail client, comprising: a portion that accepts input from a first user specifying an e-mail address of a second user; a portion that stores the e-mail address of the second user in a memory; a portion that associates a unique code with the stored e-mail address of the second user; and a portion that, when the system receives a facsimile message from the first user and the facsimile message is associated with a code that is the unique code assigned to the second user's stored e-mail address, sends the contents of the facsimile message to the e-mail address of the second user.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of: receiving, from one of a computer system over the internet and a facsimile machine over telephone lines, an e-mail message addressed to a first user from a second user, and including an e-mail address of the second user; determining a telephone number of a facsimile machine assigned to the first user, in accordance with the e-mail address of the first user; and sending a facsimile message that contains the contents of the e-mail message to the determined telephone number.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of: receiving, from one of a computer system and a facsimile machine, an e-mail message addressed to a first user from a second user, and including an e-mail address of the second user; requesting from the first user, once the first user has requested that his e-mail be sent to him, a telephone number of a facsimile machine to which the first user wishes his e-mail to be faxed; receiving input from the first user specifying a telephone number of a facsimile machine; and sending, to the specified telephone number, a facsimile message that contains the contents of

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in further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of: receiving a facsimile message, sent from a facsimile machine by a first user, where the facsimile machine dialed an internet fax number associated with a second user; determining the identity of the first user in accordance with a Customer Service ID of the facsimile machine; determining, from an address book data structure of the first user, an e-mail address of the second user, in accordance with the internet fax number dialed by the facsimile machine; and sending an e-mail message, containing the received facsimile message, to the second user at the determined e-mail address.

In further accordance with the purpose of the invention, as embodied and broadly described herein, the invention relates to a system that enables a facsimile machine to behave like an e-mail client, comprising: a portion that sends a first fax message to the facsimile machine, the first fax message including the contents of a first e-mail message sent by a second user to a first user, the first e-mail message including the e-mail address of the second user; and a portion that sends a second e-mail message to the second user in accordance with a second fax message received from the facsimile machine, the second fax message sent by the first user.

A further aspect of the present invention involves the way that the system vocally prompts the user when the user enters alphanumeric information via the keypad of a touchtone telephone. As the user touches a key one, two, three, or four times, the system vocally echoes a corresponding character using a first, questioning inflection. Once the user touches an "end key (such as "#")", the system indicates that it has accepted the last character echoed by pronouncing the character again using a second, declarative inflection. Use of two different inflections provides a verbal cue for the user that the character was properly recorded. Such a verbal cue minimizes user confusion.

Objects and advantages of the invention will be set forth in part in the description which follows and in part will be obvious from the description or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements, method steps and combinations particularly pointed out in the appended claims and equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and, together with the description, serve to explain the principles of the invention.

FIG. 1 is a block diagram showing an overview of a computer and telephone network usable by a preferred embodiment of the present invention.

FIG. 2 is a block diagram of a path of a message in the system of FIG. 1.

FIG. 3 is a block diagram of a computer system used in accordance with a preferred

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FIGS. 4(a) through 4(c) are block diagrams showing various paths taken by messages in the system of FIG. 1.

FIGS. 5-8 are flow diagrams showing an organization of a user input menu.

FIG. 9(a) shows an example format of an address book data structure.

FIG. 9(b) shows an example format of a database storing messages received by a user.

FIG. 10 is a block diagram of flow between elements of an administrative system and an Electronic Post Office (EPO) of FIG. 1.

FIG. 11 is a flow chart of steps performed by an InMail process of FIG. 10.

FIG. 12 is a flow chart of steps performed by an OutMail process of FIG. 10.

FIG. 13 is a flow diagram showing elements of the EPO of FIG. 10.

FIG. 14 is a flow chart showing steps performed by a Dispatcher of FIG. 13.

FIG. 15 is a flow chart showing steps performed by a Timer of FIG. 13.

FIG. 16 is a flow chart showing steps performed by an Enqueuer process in a Queue processor of FIG. 13.

FIG. 17 is a flow chart showing steps performed by a Dequeuer process in the Queue processor of FIG. 13.

FIG. 18 is a flow chart showing steps performed by a Requeuer process in the Queue processor of FIG. 13.

FIG. 19 is a flow chart showing steps performed by an Acknowledger in the Queue processor of FIG. 13.

FIG. 20 is a flow chart showing steps performed by a Mailman process of FIG. 13.

FIGS. 21 and 22 are flow charts showing steps performed by a Call processor of FIG. 13.

FIG. 23 is a flow chart showing steps performed by an EPO request handler of FIG. 10.

FIG. 24 shows an example format of a "job" entry in a queue data structure used in a preferred embodiment of the present invention.

FIGS. 25(a) through 25(c) are flowcharts showing steps used in a preferred embodiment of the present invention to allow the user to enter alphanumeric characters via a keypad of a touchtone telephone.

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Reference will now be made in detail to preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

I. System Overview

FIG. 1 is a block diagram showing an overview of a computer and telephone network usable by a preferred embodiment of the present invention. FIG. 1 includes a plurality of users, such as users 110, 130, 140, and 150. Each user is assumed to have access to a fax machine. The fax machines of users 110, 130, 140, and 150 connect, via respective local/city telephone systems 103, to respective Electronic Post Offices (EPOs) 112, 132, 142, 152. The EPOs are in turn connected to respective Internet Service Providers (ISPs) 114, 134, 144, 154, which are in turn connected to a network such as the internet. 170. It will be understood that the present invention can also be used in conjunction with networks other than the internet, such as intranets, for example. The invention can also be used with any appropriate combination of network types.

FIG. 1 further shows an administrative site 100, which connects to an ISP 111. It should be understood that administrative site 100 and at least one of the EPOs can be connected by the internet, as shown, but can alternately be connected by any other appropriate kind of network. This situation may occur, for example, if administrative site 100 and an EPO are located at the same physical location.

ISP 111 connects to a network such as the internet 170. FIG. 1 also shows a computer 120, which connects to the internet. Computer 120 (and the EPOs and administrative site) may connect to the internet via an ISP or may connect directly. Note that, because they use the internet, messages between administrative site 100 and the EPOs do not incur long distance phone charges. Calls between EPOs and users 110, 130, 140, and 150 preferably are local calls.

FIG. 2 is a block diagram of a path of a message in the embodiment of FIG. 1. Messages pass through fax server 200 (in an EPO) and through administrative site 100, which includes a mail processing agent 202 and an SMTP server 204.

FIG. 3 is a block diagram of a computer system used in accordance with the embodiment of FIG. 1. Although FIG. 3 shows an implementation of mail processing agent 202, a person of ordinary skill in the art will appreciate that fax server 200 SMTP server 204, and EPOs 112, 142, 152 are implemented in a similar fashion.

In FIG. 3, computer system 204 includes a processor 302; a memory 304; input/output lines 305; an input device 350, such as a keyboard or mouse; and a display device 360, such as a display terminal. Computer 204 also includes an input device 361, such as a floppy disk drive or CD ROM reader, that reads computer instructions stored on computer readable medium 362, such as a floppy disk or a CD ROM. These computer instructions are the instructions of e.g., mail processing

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their operation.

A person of ordinary skill in the art will understand that memory 304 also contains additional information, such as application programs, operating systems, data, etc., which are not shown in the figure for the sake of clarity. It also will be understood that computer system 204 can also include numerous elements not shown in the Figure for the sake of clarity, such as disk drives, keyboards, display devices, network connections, additional memory, additional CPUs, LANs, internet connections, input/output lines, etc.

In the following discussion, it will be understood that the steps of methods and flow charts discussed preferably are performed by processor 302 (or similar processors) executing instructions stored in memory, such as instructions of mail processing software 320. It will also be understood that, the invention is not limited to any particular implementation or programming technique and that the invention may be implemented using any appropriate techniques for implementing the functionality described herein. In the described embodiment administrative site 100 is written in the C++ programming language and runs under the Windows 95 operating system. ("Windows 95" is a trademark of Microsoft, Inc.). The EPOs are preferably written in VOS (Voice Operating System) for DOS. VOS is available from Parity Software. The present invention, however, is not limited to any particular programming language or operating system.

FIGS. 4(a) through 4(c) are block diagrams showing various paths taken by messages in the system of FIG. 1. FIG. 4(a) shows a path for an e-mail message sent from a computer to a fax machine. In the figures, lines having a "I" represent travel over the internet 170 (or other appropriate network), while lines having a "T" represent travel over a telephone system 103. In FIG. 4(a), an e-mail message addressed to a customer of the system is sent by a computer, such as computer 120 of FIG. 1, to an ISP, such as ISP 111 of administrative site 100 via the internet. Administrative site 100 sends the message to the EPO associated with the user's receiving fax machine, which forwards the message to the user's fax machine, such as user fax machine 130, via the telephone lines. If a facsimile machine is a designated facsimile machine of the first user, the EPO determines a telephone number of the facsimile machine, in accordance with an e-mail address of the first user and sends the first facsimile message to the determined telephone number. Thus, each facsimile machine user has his or her own e-mail address at which he or she receives e-mail.

FIG. 4(b) shows a path for an e-mail message sent from a fax machine of a customer of the system to a computer. An e-mail message is sent by a user fax machine, such as user machine 130 of FIG. 1 via the telephone lines to an EPO associated with the fax machine (e.g., in the same calling area as the fax machine). The EPO sends the message to administrative site 100, which sends an e-mail message containing the contents of the fax message to computer 120, via the internet.

FIG. 4(c) shows a path for an e-mail message sent from a first fax machine to a second fax machine. (Actually, each of these paths is a combination of sending a

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machine, such as user machine 130 of FIG. 1 via the telephone lines to an associated first EPO. The first EPO sends the fax message to administrative site 100, which sends the message as an e-mail over the internet to the second customer of the system. Because e-mail for the second customer goes to administrative site 100, the administrative site receives the e-mail intended for its second customer, converts it to a fax message, and sends the fax message to a second EPO associated with the second user's fax machine. The EPO sends the fax to the user's fax machine via telephone lines 103. The message does not necessarily have to go through an ISP to return to administrative site 100. It would just be processed as outgoing and incoming e-mail at the administrative site without going through an ISP.

II. User Telephone Interface

FIGS. 5-8 are flow diagrams showing an organization of a user input menu in a preferred embodiment of the present invention. The user places a voice call to a predetermined telephone number of an EPO (preferably a local EPO, to save on long distance charges). The EPO interacts with the user to prompt the user and process the user's responses to the prompts. The user prompts are preferably spoken via a recorded or synthesized voice. The user enters his responses by using the keys on a touchtone telephone. The system described below is called an Interactive Voice Response (IVR) system. Using the IVR, the user can perform activities such as entering e-mail addresses in his address book and retrieving (under certain circumstances) his held e-mail messages. The user can also change various system parameters.

As shown in FIG. 5, the user must first log in to the EPO by entering his account number and password. The described IVR Power-user menu has three main choices: Remote send; a main menu (including an address book, archive operations, and configuration options); and Power retrieval. Various systems may allow certain users to perform some subset of the following functions. For example, in the described embodiment, some users are not allowed to perform remote retrieval. Instead, all their messages are sent to their default fax machine as soon as the messages are received

It should be understood that the IVR system described herein is presented for purposes of example and should not be taken to limit the present invention in any way. Any interface, whether an IVR system or some other type of system, can be used with the present invention, as long as it enables the user to manage basic functions such as sending, receiving, the address book function, and archives.

a) Remote Send

If the user selects "Remote send," the user is prompted for the recipient's internet fax number. After the user enters the internet fax number and presses the "send button" on the fax machine, the system receives the facsimile message and sends an e-mail message to e-mail address of the person associated with the entered internet fax number for the user. The e-mail message contains the contents of the facsimile message.

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i) Address Book

The address book feature of the described embodiment allows the system to save e-mail addresses so that the user does not have to enter them each time. The user can send a message to a person whose address is in the address book by faxing the message from his registered fax machine to the internet fax number assigned to that person in the address book. Each time e-mail is received by the user from someone who has previously not sent the user e-mail, the system automatically makes an entry in the address book. The user can also manually add people to his address book as shown in FIG. 6.

FIG. 9(a) shows an example format of the address book data structure. Each user has an address book containing N internet fax numbers. In a preferred embodiment, an EPO has 1000 internet fax numbers assigned to it, so N is equal to 1000. (Other implementations can use other values of N). Each user has the same N internet fax numbers in his address book (though some may not be assigned). The system determines to which e-mail address to send a message faxed by a particular user by first locating the address book for the current user and then by doing a lookup operation on the internet fax number dialed/entered by the user to send the fax. Thus, for each user, an internet fax number is a "unique code" identifying potential recipients of e-mail from the user.

If the user selects the "address book," option, the user is prompted to choose between three more options: get list of addresses; add an address; and remove an address.

FIG. 6 shows details of the address book options. If the user selects "get list of addresses," the system prepares pages containing the printed contents of the user's address book (i.e., the e-mail address and assigned internet fax numbers for each entry) and control passes to step C of FIG. 6 (described below), where the prepared pages are faxed to the user at the specified fax machine.

If the user selects "add an address," the system prompts the user for the e-mail address of the new entry, places the e-mail address in the next empty internet fax number in the user's address book, and echoes the new internet fax number to the user. If the user selects "remove an address," the system prompts the user for the internet fax number of the new entry, removes the entry corresponding to the internet fax number from the user's address book, reserves the vacated internet fax number for later assignment, and echoes a "successful completion" message to the user.

Step C of FIG. 6 is repeated for a number of functions in the described embodiment and, thus, is described separately in the following paragraph. After the system has prepared one or more pages of information to be faxed to the user, the system prompts the user for the location of the fax machine to which to send the pages. In the described embodiment, the system prompts the user that, if he is calling from a fax machine, he should press the "start" key on the fax machine. Since a telephone connection already exists between the system and the fax machine, the prepared

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sent to his designated regular fax machine. If the user so desires, the pages are sent. If not, the user can enter the telephone number of a fax machine where he wishes the pages sent.

Allowing the user to specify the location of the fax machine where he wishes to send information allows a user to have his information sent to the fax machine nearest his present location. This feature is extremely valuable to users who travel or who do not own their own fax machine.

ii) Message Archive

If the user selects "Message archive," the user is presented with three more choices: List past messages; Retrieve past messages; and Forward past messages. FIG. 7 shows details of each of these options.

FIG. 9(b) shows an example data structure for storing messages received by a user. Each message is assigned a message id and has one or more flags indicating whether the message has been read by the user and whether the user has archived the message.

If the user selects "List past messages," the user is prompted to determine which past messages the user wishes to view (by month and year) and the system prepares pages containing a printed list (sender, date, messages id, subject, and number of pages) of the messages specified by the user. Control then passes to step C of FIG. 6, where the prepared pages are faxed to the user at the specified fax machine. A preferred embodiment of the present invention also allows the user to retrieve listings of past messages sent/received from a specific person in the user's address book.

If the user selects "Retrieve past messages," the user is prompted to specify which past messages the user wishes to view (by message id) and the system prepares pages containing of the contents of the specified messages. Control then passes to step C of FIG. 6, where the prepared pages are faxed to the user at the specified fax machine.

If the user selects "Forward past messages to someone in address book," the user is prompted to specify which past messages the user wishes to send and to which internet fax number he wishes to send them. The system then prepares pages containing of the contents of the specified messages and the prepared pages are e-mailed to the specified recipient.

iii) Change Reception and Security Modes

As shown in FIG. 5, the user can toggle between two reception modes: Reception on Request and Direct Reception. Reception on Request means that e-mail messages sent to the user are held until the user calls in for them. Direct Reception means that e-mail messages received for the user are sent directly to his designated fax machine. Reception on Request is useful if a user travels a great deal and is not near the same fax machine very often. Direct Reception is useful for those who are

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As shown in FIG. 5, the user can also toggle security on or off. If security is on, the user must send messages via the remote send method, as discussed above. Remote send requires that the user enter an account number and a password before sending the message. In some implementations, the user must enter his account number and password to change security options, even though he has already entered it to log in to the IVR system.

c) Power Retrieval Menu

If the user selects the third option on the Power User menu (i.e., Power Retrieval), the user is prompted with three more choices: List held messages, Retrieve held messages, and Move unread messages to archive. The Power retrieval choice is offered only if the user has previously indicated that he wishes to have a reception mode of "Reception on Request."

FIG. 8 shows details of Power Retrieval. If the user selects List held messages, the system prepares pages listing the user's unread messages, including the message id of each message, and control passes to step C of FIG. 6, where the prepared pages are faxed to the user at the specified fax machine. If the user selects Retrieve held messages, the system prompts the user for the message id of the message(s) to retrieve (or for a directive to send all held messages) and prepares pages listing the contents of the user's specified messages. Control then passes to step C of FIG. 6, where the prepared pages are faxed to the user at the specified fax machine. If the user selects Archive unread messages, the system prompts the user for the message id of the message(s) to move (or for a directive to move all held messages) and moves the message to the archive.

III. Administrative Site

FIG. 10 is a block diagram of flow between elements of administrative site 100 of FIG. 1 communicating with an EPO, such as EPO 112 of FIG. 1. Administrative site 100 shares a file system with the EPOs. The file system contains messages to be sent to users' facsimile machines by the system. Administrative site 100 communicates with the EPOs via FTP (File Transfer Protocol) or any appropriate messaging system.

In administrative site 100, SMTP server 204 receives and sends e-mail messages to and from the internet 170. EPO 112 includes a connection to telephone line 103. Administrative site 100 includes a database that keeps track of recipients' preferences. The recipients are not necessarily customers/users of the system. Instead, they are persons who have, at one time or another, received an e-mail from a user of the system. These recipient preferences include preferences for each recipient of viewing software and formats to which received faxes are converted before being sent as e-mail to a recipient.

Administrative site 100 includes an InMail process 1002 and an OutMail process 1004, each of which is described below in turn. InMail process 1002 accepts an e-mail message received by SMTP server via the internet, processes it, and sends it to

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204 to be sent to the correct recipient via the internet.

In step 1102 of FIG. 11, Inmail process 1102 waits for an e-mail message from SMTP server 204. If an e-mail message is received, the process decodes the e-mail message. This step is preferably done using METAMAIL, a freeware package developed by BellCore, which handles e-mail attachments with UU or MIME encoding. In step 1106, any compressed attachments are decompressed. For example, files compressed with PKWare's PKZIP product are unzipped. If the decompress fails, the InMail process inserts a note to that effect in the message text.

In step 1108, the process converts all attachments to TIF format. In the described embodiment, this step is performed using Image Alchemy, manufactured by Handmade Software; by using Microsoft Word; and by using Netscape Navigator. If the conversion process fails, the InMail process inserts a note to that effect in the message text. In step 1110, the process forwards the text and TIF information to the EPO machine, where it is picked up by the dispatcher process of the EPO. The EPO will send a fax to the user, as described below in connection with FIG. 13.

The described embodiment of the present invention converts received e-mail to a TIF file for faxing. Other implementations of the present invention may convert e-mail to GIF format, or any other appropriate format. This implementation offers GIF and PostScript as well.

The described embodiment converts received faxes to a recipient specified format before e-mailing. Conversion of fax messages to TIF or any similar format has the advantage that the user can fax graphical information as well as text to the recipient. Use of TIF or similar formats has a disadvantage that the recipient must have the correct viewing software to read the received message.

In step 1202 of FIG. 12, the OutMail process waits for a fax message from an EPO. The fax message needs to be converted to an e-mail message and sent out. When a message is received, control passes to step 1204, where the file containing the message is locked so that no other Mail Processing Agent will "grab" the message. In step 1206, the OutMail process reads a header of the received e-mail message. If there is an error in the header, an error message is bounced back to the sender. The process extracts the e-mail address of the sender from the header and, in step 1210, determines whether the recipient has ever received e-mail from the system. If the recipient is a new recipient, he is added to a recipient database (not shown) and a TIF viewer (or any other appropriate viewer) is sent to the recipient via e-mail so that he will be able to read his incoming message when it arrives.

The described embodiment of the present invention converts received fax messages to a graphics file before sending it as e-mail. In step 1216, the outgoing e-mail is converted to a graphical format preferred by the recipient (as indicated by the recipient database). If the recipient has not indicated a preference (via an email command system, not shown), the facsimile message is converted to TIF format. Other possibilities that the recipient can indicate include GIF, UU Encode, Mime, and PostScript.

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the e-mail command system) that he is changing his format preference to GIF. In this case, the system will resend his prior messages in GIF format. The converted graphical image is then sent to SMTP server 204 to be sent to the recipient via the internet.

IV. Electronic Post Office

FIG. 13 is a flow chart showing elements of an EPO 1300. These elements include a Dispatcher 1302, a Timer 1304, a Mailbox 1303, a Queue processor 1306, a Mailman 1308, and a Call Processor 1309.

FIG. 14 is a flow chart showing steps performed by Dispatcher 1302 of FIG. 13. The dispatcher is connect to internet 170 so that it can receive messages from administrative site 100. When an e-mail message is processed by InMail process 1002, it is sent to the EPO dispatcher in step 1110 of FIG. 11 and received in step 1402 of FIG. 14. Step 1402 locks (reserves) the message for this process. If there is a message in the e-mail, control passes to step 1408, where the header is extracted. If an error occurs during header extraction, a message is bounced back to the sender in step 1410. In step 1412, the message is added to "limbo," which is a group of messages received but not available to the user because they are being processed.

In step 1414, if the sender's e-mail address is not in the user's address book, the address is added to the user's address book and an internet fax number is assigned to the sender.

In step 1416, if the user/recipient has selected Receipt on Demand, the message is added to the user's held mailbox in mailbox database 1303. Otherwise, if the user has selected Direct Receipt, the message is added to the user's received mailbox in mailbox database 1303. In step 1420, if the receive mode is Direct Receipt, then the message is scheduled to be delivered to the user in the near future. Step 1424 releases the hold on the message set in step 1402, which locked (reserved) the message for this process. Step 1426 releases the limbo status set in step 1412.

FIG. 15 is a flow chart showing steps performed by a Timer of FIG. 13. In step 1502, the timer waits for a wakeup time to occur or for a set timer message. In step 1504, if a set time message occurs and it is earlier than the current wakeup time, then the new time becomes the wakeup time. In step 1506, when the wakeup time is reached, the timer notifies the queue processor that it is time to process a queued message.

As shown in FIG. 13, the queue processor includes an enqueuer, dequeuer, requeuer, and acknowledger, the operation of which is shown, respectively, in FIGS. 16-19. FIG. 16 is a flow chart showing steps performed by the Enqueuer. The Enqueuer is notified by the timer that a job is ready for faxing, and puts the job in the queue. Step 1602 waits for the timer to pop. If, in step 1604, a scheduled item is ready for delivery, control passes to step 1606.

A "job" is a file/message to be faxed. A "user" (in the context of FIG. 16) means that the system is to prepare all unread messages for the given user (i.e., create a job

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retrieved as shown in FIG. 18. If, in step 1606, the scheduled item is a user, the system creates a job for the user's unread messages in step 1608 and places the newly created job in the queue in step 1612.

FIG. 17 is a flow chart showing steps performed by the Dequeueur. The dequeueur waits for the mailman to request a fax to send in step 1702. When such a request is received, if, in step 1704, there is an item in the queue, the item is removed from the queue, placed in "queue limbo" and passed to the mailman process to be faxed out.

FIG. 18 is a flow chart showing steps performed by the Requeueur. The requeueur places failed jobs back into the queue for re-faxing. Step 1802 waits for a file to requeue. When this occurs, the requeueur determines whether the file has exceeded a predetermined retry count value. If so, the message is bounced back to the sender in step 1806. If not, step 1808 determines an amount of delay to wait before retrying. The amount of delay can be based on any appropriate formula, such as "if the fax machine is busy, retry in three minutes; if the fax machine is out of paper, retry in four hours." Step 1810 schedules the job for a next delivery attempt. Step 1812 releases the job from queue limbo.

FIG. 19 is a flow chart showing steps performed by an Acknowledger. The Acknowledger removes successful faxes from limbo (see step 1706 of FIG. 17). When, in step 1902, a fax acknowledgment message is received and if, in step 1904, there were messages delivered in the current fax, the delivered messages are moved to the archive. In either case, the file is released from queue limbo.

FIG. 20 is a flow chart showing steps performed by the Mailman process of FIG. 13. In step 2002, the Mailman requests the next job from the dequeueur. If no job is ready, the Mailman waits for the queue to tell it that a job is ready in step 2004. Otherwise, in step 2006, the Mailman notifies the call processor of the new job.

FIGS. 21 and 22 are flow charts showing steps performed by a Call processor of FIG. 13. A preferred embodiment of the present invention has one call processor process for each telephone line. The call processor waits for a call or fax send and may send or receive a fax depending on the type of call. It also presents voice menus to callers accessing the EPO and processes their responses.

In steps 2102 and 2104, once a call has been received, the call processor determines whether the call is incoming (to the EPO) or outgoing (from the EPO). If the call is outgoing, the call processor performs steps 2108 through 2126. If the call is incoming, the call processor performs steps 2140 through 2216 (of FIG. 22).

The following paragraphs discuss processing of an incoming call. In step 2106, the call processor determines whether the incoming call is for the interactive voice response (IVR) system (which handles user requests as shown in FIGS. 5-8) or whether the incoming call is from a fax machine. If the call is for the IVR, the call will be made to the predetermined IVR telephone number. In this case, control passes to FIG. 22. If the incoming call is from a fax machine, control passes to step 2140.

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receive attempt in a system log (not shown). In steps 2144 and 2146, the call processor receives the fax message and logs the fax results. The fax message is then added to send mailbox 1303. In step 2150, the call processor determines which fax machine originated the call by looking at the CSID (Customer Service ID) of the calling fax machine. Alternately, the calling fax machine can be identified by the caller ID number provided by the telephone company (if caller ID service is available). The customer service ID is the code sent from a conventional sending fax machine that identifies the fax number of the sending fax machine. Once the call processor knows the CSID of the calling fax machine, it also knows the identity of the user. The call processor then determines the e-mail address of the intended recipient by looking up the dialed number (the DID or "Direct Inward Dialing" number) in the user's address book. As discussed above, each user's book has a plurality of e-mail addresses associated with a corresponding plurality of DID numbers. If two users share a fax machine as their designated fax machine, a preferred embodiment of the present invention will assign internet fax numbers so that the internet fax numbers of the two users do not overlap. Thus, a combination of the CSID and the internet fax number serves to identify the user.

In step 2152, the fax message is forwarded to the OutMail process 1004 of FIG. 10, where it is converted to a graphics file and e-mailed to the intended recipient.

FIG. 22 shows steps performed when the call processor in an EPO processes an incoming IVR call from a user. If the system successfully reserves a voice line in steps 2202 and 2204, the call processor prompts the user for his account number and password. If these are valid, the call processor plays a first prompt (see user prompt tree of FIGS. 5-8) and processes the user's response.

If the user requests an operation that sends information to the user via fax (such as a request for a listing of the user's address book), control passes to step 2212. In step 2212, if the request is a type that is scheduled, a job is submitted to the scheduler in step 2216. If the job is to be performed immediately, control passes to step 2108 of FIG. 21 and the requested information is faxed to the user immediately. An example of a scheduled job is when the caller types in a fax number to which he wants his pages sent. In an immediate job, the caller is calling from his fax machine and presses the "start" button during the call.

If, the user request involves the user sending a fax (e.g., a remote send), control passes to step 2140 of FIG. 21. Otherwise, control returns to step 2208 to process more user IVR requests.

In step 2108, if the message to be processed is an outgoing message, the call processor reserves a fax channel, and reserves a free source number for the user. In a preferred embodiment of the present invention, a user can have more than one fax machine registered. Each registered fax machine has a source number. If one registered fax machine is busy, the system will try each registered fax machine in turn. Step 2116 logs the attempted fax send and steps 2118 and 2122 send the fax and log the fax results. Step 2124 records the CSID for this source in a source database (not shown). The CSID is recorded so that, if the system gets a call from a fax machine with a recorded CSID, it will identify it with the recorded source. (this

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Step 2126 instructs Acknowledger of FIG. 19 to acknowledge the successful fax. Note that failure in any of steps 2108, 2112, 2118, or 2126 causes the outgoing fax message to be requeued and retried again at a later time.

FIG. 23 is a flow chart showing steps performed by an EPO request handler 1008 of FIG. 10. Handler 1008 interacts with the EPO to change a user ID. In steps 2302 and 2304, the handler receives a request from the EPO and determines its type. If the request is to change the user ID, then, in step 2306, the specified user ID is added or changed in the SMTP mail server 204.

FIG. 24 shows an example format of a "job" entry in a queue data structure used in a preferred embodiment of the present invention. Each job to be sent is entered in the queue, using the format of FIG. 24, as discussed above. If a user's held message(s) are to be sent, the system creates a queue entry for the held messages, using the format of FIG. 24. The format of FIG. 24 is provided for the purpose of example only. Other appropriate ways of handling messages could be used without departing from the scope of the present invention. In FIG. 24, each queue entry preferably includes a user id number (to identify the user), a fax number to dial to send a fax to the user, a file/message to fax (can be text or TIF), and a number of previous failures of various possible types.

V. Non-Ambiguous Entry of Alphanumeric Characters

A preferred embodiment of the present invention allows the user to enter alphanumeric information, such as e-mail addresses, via a touch tone telephone. Most telephone handsets have the letters A-P and R-Y on the handset. Traditionally, the number "1" has been used for the letters "Q" and "Z", although any number or numbers can be used. The described embodiment uses a first, questioning inflection to echo a character as the user touches the key once, twice, or three times. After the user touches an "end" key, the system uses a second, declarative inflection to indicate that the character has been accepted by the system.

FIG. 25(a) shows an example of steps performed by the system to allow the user to enter an alphanumeric character via the keypad of a touchtone telephone so that the user is not confused when the character is spoken twice by the system. The described method can also be used for other types of systems where the user uses a keypad to enter information.

In step 2502 the user touches a key such as the "2" key one time. The system (assuming it has enough time before they next key press) pronounces the one-touch character (e.g., "A") with a first inflection, such as a questioning inflection. A questioning inflection implies that the system has not yet accepted the pronounced character and is awaiting more input.

If, in step 2506, the user touches the same key again, the system (assuming it has enough time) pronounces the two-touch character (e.g., B") with the first (e.g., questioning) inflection in step 2508. If instead, the user touches the "end" key (such as "#") in step 2504, control passes to step 2530 of FIG. 25(b). If, at any time, the

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repeated for the newly pressed key.

If, in step 2512, the user touches the same key again, the system (assuming it has enough time) pronounces the three-touch character (e.g., "C") with the first (e.g., questioning) inflection in step 2514. If instead, the user touches the "end" key in step 2510, control passes to step 2530 of FIG. 25(b).

If, in step 2518, the user touches the same key again, the system (assuming it has enough time) pronounces the four-touch character (e.g., "2") with the first (e.g., questioning) inflection in step 2520. If instead, the user touches the "end" key in step 2516, control passes to step 2530 of FIG. 25(b).

If the user touches the key a fifth time in step 2524, control passes to step 2502, where the process is repeated. If, after touching the key four times, the user touches the "end" key in 2522, control passes to step 2530 of FIG. 25(b).

In step 2530, the user has touched a key one, two, three, or four times, and has touched an end key to indicate that the user wishes to enter the indicated alphanumeric character. In this situation, the system echoes the indicated alphanumeric character with a second, declarative inflection, such as a steady (or falling) inflection. A declarative inflection implies that the system has accepted the user's entry. The difference between the first and the second inflection provides audio clues for the user as to why the character is being echoed two times (once when the user initially touches a key and once when the user indicates that he wants to enter a character). Such audio clues avoid user confusion and increase the accuracy of user entries in the system.

In summary, the present invention enables users having access to only a fax machine to send and receive e-mail easily. If the user selects a "Direct Receipt" receive mode, e-mail is automatically sent to his fax machine, where it can be printed out and read. If the user selects "Receipt on Demand," the user calls a predetermined telephone number and answers voice prompts to instruct the system where to fax his unread e-mail. In either case, the fax received by the user contains the contents of the e-mail message intended for the user. To send e-mail from his fax machine, the user establishes an "address book" of e-mail addresses, each of which is associated with a fax number (an internet fax number). If the user sends a fax message to an internet fax number associated with a particular recipient in the user's address book, the system sends an e-mail message containing the contents of the fax message to the recipient associated with the internet fax number.

Other embodiments will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope of the invention being indicated by the following claims and equivalents.

Claims of corresponding document: US6157706

What is claimed is:

1. A system that enables a facsimile machine to behave like an e-mail client, comprising:
 - a portion that accepts input from a first user specifying an e-mail address of a second user;
 - a portion that automatically stores the e-mail address of the second user in an address book data structure assigned to only the first user in a memory;
 - a portion that associates an internet fax number with the stored e-mail address of the second user in memory; and
 - a receiving portion that receives a fax from the facsimile machine of the first user that has been sent to the internet fax number associated with the e-mail address of the second user;
 - a selection portion for selecting from a set of at least one address book data structure the address book data structure assigned to only the first user that includes the internet fax number associated with the stored e-mail address of the second user; and
 - a sending portion for sending the contents of the fax to the e-mail address of the second user stored in the selected address book data structure.
2. The system of claim 1, wherein the selecting portion further includes a portion that converts the fax message to TIF format.
3. The system of claim 1, where the selection portion includes a portion that determines that the received facsimile message is from the first user by checking one of a CSID and a caller ID number of the facsimile machine sending the message.
4. The system of claim 1, where the selection portion includes a portion that determines that the received facsimile message is from the first user because the first user sent the message via a remote send command.
5. A method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of:
 - receiving, from one of a computer system over the internet and a facsimile machine over telephone lines, an e-mail message addressed to a first user from a second user, and including an e-mail address of the first user and the second user, the first user being a user of the fax machine;
 - determining a telephone number of a facsimile machine assigned to the first user, in accordance with the e-mail address of the first user;
 - sending a facsimile message that contains the contents of the e-mail message to the determined telephone number; and
 - selecting an address book data structure of the first user from a set of at least one address book data structure;

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first user, the selected address book data structure being stored in a memory.

6. A method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of:

receiving, from one of a computer system and a facsimile machine, an e-mail message addressed to a first user from a second user, and including an e-mail address of the second user, the first user being a user of the fax machine;

requesting from the first user, once the first user has issued a request to receive e-mail, a telephone number of a facsimile machine for receiving e-mails that are faxed to the first user;

receiving input from the first user specifying a telephone number of a facsimile machine;

sending, to the specified telephone number, a facsimile message that contains the contents of the e-mail message;

selecting an address book data structure assigned to only the second user from a set of at least one address book data structure;

automatically adding the e-mail address of the first user to the selected address book data structure of the second user, along with a unique internet fax number of the first user, the selected address book data structure being stored in a memory.

7. The method of claim 6, further including the step of notifying the user, using one of a pager or a telephone, when the e-mail message addressed to a first user from a second user is received.

8. A method for enabling a facsimile machine to act as an e-mail client, comprising the steps, performed by a data processing system, of:

receiving a facsimile message, sent from a facsimile machine by a first user, where the facsimile machine dialed an internet fax number associated with a second user; determining the identity of the first user in accordance with a one of a CSID and a caller ID number of the facsimile machine;

selecting an address book data structure assigned to only the first user from a set of at least one address book data structure;

determining, from the selected address book data structure, an e-mail address of the second user, in accordance with the internet fax number dialed by the facsimile machine; and

sending an e-mail message, containing the received facsimile message, to the second user at the determined e-mail address.

9. A system that enables a facsimile machine to behave like an e-mail client, comprising:

a portion that sends a first fax message to the facsimile machine, the first fax message including the contents of a first e-mail message sent by a second user to a first fax machine user, the first e-mail message including the e-mail address of the second user;

a portion that sends a second e-mail message to the second user in accordance with a second fax message received from the facsimile machine, the second fax message sent by the first user, the portion that sends the second e-mail message sending the second e-mail message in accordance with the identity of the first user, as determined by a one of a CSID and a caller ID number of the facsimile machine

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a portion that extracts, from the first e-mail message, the e-mail address of the second user;
a portion that selects an address book data structure assigned to only the first user from a set of at least one address book data structure; and
a portion that adds the e-mail address of the second user to the selected address book data structure of the first user, along with an internet fax number assigned to the second user.

10. The system of claim 9, wherein the portion that sends the first fax message to the facsimile machine includes:
a portion requesting from the first user, once the first user has requested that his e-mail be sent to him, a telephone number of a facsimile machine to which the first user wishes his e-mail to be faxed;
a portion receiving input from the first user specifying a telephone number of a facsimile machine; and
a portion sending, to the specified telephone number, the first facsimile message.

11. The system of claim 9, wherein the facsimile machine is a designated facsimile machine of the first user and wherein the portion that sends the first facsimile message includes:
a portion determining a telephone number of the facsimile machine, in accordance with an e-mail address of the first user; and
a portion sending the first facsimile message to the determined telephone number.

12. A method of inputting an alphanumeric character, comprising the steps performed by a data processing system receiving input via a keypad, of:
receiving an indication that a user has touched a key on the keypad at least one time to enter the alphanumeric character;
verbally echoing the alphanumeric character corresponding to the touched key, using a first inflection when the user has touched a key on the keypad at least one time;
after the first echoing step, receiving an indication that the user has touched an "end" key on the keypad; and
verbally echoing the character using a second inflection when the end key is pressed.

13. The method of claim of claim 12, where the first inflection is a questioning inflection and the second inflection is one of a steady inflection and a falling inflection.

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